THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

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Observe. Compare, Reflect, Record.

VOL. XI.

PHILADELPHIA:
SAMUEL S. WHITE, PUBLISHER,
CHESTNUT STREET, CORNER OF TWELFTH.
1869.

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THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, JANUARY, 1869. No. 1.

ORIGINAL COMMUNICATIONS.

PIVOT TEETH.

Read before the Massachusetts Dental Society.

BY E. BLAKE, BOSTON, MASS.

I SHALL present for your attention this evening the subject of "Pivot Teeth." This method of inserting teeth is very much neglected at present, and has received little discussion in this society.

There are many considerations that should have weight with a dentist in deciding what particular operation he ought to employ in any given case. Durability, use, health, beauty, cost, and the circumstances and caprices of his patient, must all have their influence in forming the judgment. There are estimated to be twelve thousand dentists in the United States, and their patients come to them from every condition of life. It were absurd to expect all the members of this great fraternity of practitioners, under such diverse conditions, to follow the same routine of practice. Within the limits of honesty and science, a wide difference of method must be allowed without opprobrium.

Before describing the different methods of inserting pivot teeth, we will consider the conditions which indicate their use. While I believe this operation the best of all in many cases where others are usually employed, discrimination and judgment are required in its use. If a tooth be attached to every root that will temporarily retain a pivot, the result will give little satisfaction to the dentist, and less to the patient. A root for this purpose should be sound, and its investing membranes in a healthy condition. Nor will it do to have too many of them in juxtaposition. Though strong and useful when flanked by sound natural teeth, where several contiguous teeth are to be supplied, greater usefulness and permanence can be secured by using a plate with clasps. But where there are not more than two or three, or there is alternately a

sound tooth and a broken, diseased one to be replaced, this is the best possible method of restoring the denture to usefulness and beauty. In such a case it is utterly impossible to give the mouth so natural an appearance by any other means. And it is important, too, that the necessity of wearing a plate be avoided when practicable. A plate of any size or kind is a foreign body in the mouth, and always produces more or less annoyance to the wearer. When it *must* be worn, it should be made as small as the requirements of the case will admit. I think it may be fairly claimed for pivot teeth that they cost less, are equally useful and durable, and give far greater naturalness and beauty of expression than any others.

Yet, notwithstanding these advantages, they have rapidly fallen into disuse. At our different dental depots in this city, they estimate their present sales of this class of teeth at from one-hundredth to one-tenth of what they were fifteen or twenty years ago, while the sale of all other kinds has vastly increased. I cannot account for such a change. But, undoubtedly, two causes have contributed to produce it. First, since the introduction of rubber plates, a certain class of destructive dentists have adopted the practice of wholesale extraction for the purpose of substituting cheap artificial dentures. And secondly, more recently, another class has gone to the opposite extreme, and deformed the mouth with gold jewelry, when nature intended it only for ornanents of pearl. But this last caprice will pass away as ideal art assumes its rightful supremacy over mere mechanical use. To insure all the advantages of pivot teeth, however, the best methods of insertion must be employed.

Pivot teeth can be inserted upon the roots of any of the incisors, cuspidati, or bicuspids, superior or inferior, except where the bifurcation of the roots of the superior bicuspids takes place very near the crown. But the teeth for which they can be substituted best of all, are the superior incisors and cuspidati. The anatomical form of the roots of the other teeth named being smaller and much narrower, render them far less suitable for this purpose. A great variety of opinion and practice prevails among dentists in regard to the best manner of attaching artificial crowns to natural roots. The earliest and still most common method is by using the plain wooden pivot. Some use a gold pivot cased in wood. Some proscribe the use of any destructible material like wood, and insist upon the use of gold or platinum only. When either of these is adopted, it is necessary to protect the root with a thin gold tubing. This tubing is usually made with a longitudinal slit, so that it may be slightly compressed when forced into position, and thus retained in place. It must be nicely fitted to the size of the pivot-hole, and the protruding end filed smooth with the external end of the root. Then an ordinary pivot tooth may be used by adjusting the gold or platinum pivot in the pivot-hole and flowing in solder. But a better way

is to cap the end of the root with thin gold plate, to be retained in place by a gold pivot attached to it and passing into the gold tube in the root, and then upon this plate a common plate tooth may be mounted in the usual manner.

This metallic pivot, being of the exact size of the tubing in the root, is readily adjusted, and may be removed and replaced by the patient at pleasure. An improvement on the last method is the adaptation of a hollow screw to the pivot-hole in the root. A screw-tap is used to cut a thread on its inner walls—the hollow gold screw screwed home to its place—the extruding end filed smooth with the end of the root, and a tooth mounted as in the last case. Some roots, too much decayed at the exposed end to retain teeth by the ordinary wooden pivot, if the interior portion is sound, may still be made useful for a long time by the use of these gold tubes, and building up around them with adhesive gold to restore the lost portion of the root. In all the cases thus far described, the root to be operated on is presumed to stand in its proper place in the arch of the jaw, or very nearly so. But nature is sometimes eccentric, and cases are presented where the roots do not stand in their proper position. It then becomes necessary, after preparing and tubing the root, to fit a gold plate covering the end of the root to which it is attached, and extending beyond it upon the gum to the place where the new tooth is required. Upon this base mount a plate tooth. A combined pivot and clasped attachment is an excellent method where there is a good tooth on one side of the jaw, and one or two good roots but no tooth on the other side. The root is prepared as before, and then a gold plate is fitted in the usual manner, and retained *in situ* by a clasp upon the tooth, and a gold pivot adjusted to the gold tube in the root. Teeth attached in this manner answer admirably every requisite in an artificial denture.

Whichever method may be chosen for attaching the tooth to the root, the preparation of this is nearly the same in all, and is the first thing to be done. After removing the crown with excising forceps, a coarse-cut oval or half-round file is used to reduce the projecting end to its proper form and position. Its position should be just above the free margin of the gum, and its form the arc of a circle. The next thing to be done is to drill a pivot-hole. If it is to be tubed with gold, it may be drilled of the proper size at once, and *always* follow the nerve canal in the centre of the root. But if a wood pivot is to be used, it is of primary importance that it shall be made straight. It is a common practice to use a crooked pivot when necessary to change the position of the tooth upon the root. This is done by trimming the pivot at its ends and the point of junction between the tooth and root. But these crooked pivots, having far less strength than straight ones, are more liable to bend or break. To be able, then, to use a straight pivot in

such a case, change the direction of the pivot-hole in the root by drilling it diagonally across the dental canal at any angle necessary to bring the tooth into its proper position. No fear need be felt that the root will be unduly weakened; for when a root is split, the fracture always takes place lengthwise: and where by this method the root is made weakest at one end of the pivot-hole, it is left strongest at the other; thus leaving its resisting power nearly equal on every line of its circumference.

But all our care and skill in the preparation of the root may be neutralized and rendered almost worthless in the final result, if we use poor or improperly prepared wood for pivots. Pivot wood must be hard, strong, and tough—not brittle or easily bent. Old, well-seasoned hickory best answers these requirements. All wood, like a tooth, becomes dense with age by the deposition of new material within the old structure. Thus the central portion of an old tree, which is of a dark color, becomes very dense, though at the same time slightly brittle; while the newly-formed wood near the circumference is soft and easily bent. The light-colored wood, nearest the dark, is therefore the best adapted to our use.

Having thus carefully selected our wood, it should be sawed into blocks three or four inches long. It will be noted that between each concentric circle, which indicates a year's growth of the tree, is an interstitial space of a more porous structure. In splitting these blocks into sticks for pivots, we must split through these porous spaces. This will enable us to file or scrape away all the soft porous wood, leaving only the densest portion of which to form pivots. These sticks are to be made round with the knife or file, and then condensed by being drawn through a wire-plate. Such pivots as these, used straight, as they always should be, I venture to assert are stronger and more durable than any mongrel kind of wood and gold. The commercial pivot wood sold at our dental depots is not always *quite* what it should be, and any dentist who means to use the best may prepare it himself.

All this is preliminary to our object—the insertion of the tooth. Select one of the right size, form, and color. This is very easily written, like the direction in the cook-book, how to cook a rabbit. "First, catch the rabbit." But like that, it is sometimes very difficult to do, and the patience is often exhausted before the taste is satisfied.

Those dentists who manufacture the teeth they use are no worse off than ever. But those of us who buy them, find on sale an old stock, consisting chiefly of venerable relics that have been in the market and familiar to our eyes for a generation. Few new teeth of this class are manufactured, and no improvement is made. This is not solely the fault of the manufacturer. If the profession demanded anything better it would come. But the sale is so small, that it does not pay to keep a large stock on hand.

After the tooth is selected, drill a small pivot-hole in the root and insert the tooth on a temporary pivot. This is done to ascertain if the direction of the pivot-hole in the root must be changed. If the tooth is found to stand in the right position in the dental arch, prepare for its final insertion by drilling the pivot-hole in the root of the same diameter, but a trifle deeper than that in the tooth. But if, on trial, the tooth is found to incline inwardly, outwardly, or laterally, then, when enlarging the pivot-hole, change its direction sufficiently to effect the desired result. To accomplish this, repeated trials may be necessary. The nerve canal beyond the pivot-hole must now be filled with gold, the end of the root smoothed with a fine file, and the base of the tooth ground until there is perfect contact at every point. The permanent pivot may now be fitted, and should be as large as can be forced into position with the fingers; or a slight blow may be added, letting a thin piece of wood break the concussion.

My own practice, for many years past, has been to insert pivot teeth on straight, wooden pivots, in all cases where this could be done. And where it could not, I have tubed the root with gold, capped it with plate, confined it to the root with a gold pivot, and, when necessary, extended the plate, and added a clasp to some neighboring tooth, and then upon this plate mounted a plate tooth. These two methods have satisfied me and my patients better than any others.

Having got the "right tooth in the right place," our work is done. Beauty takes the place of deformity, and usefulness of annoyance and discomfort. The rosy, festooned gums cling closely around the necks of the teeth, natural and artificial alike, and no casual eye detects one from the other. No cumbersome plate interferes with speech or the sense of taste. No disagreeable lump of gold shocks our sense of beauty. By whatever standard our work is judged, economy, comfort, health, beauty, usefulness, or durability, it meets the demands of all just criticism. In naturalness of expression and beauty of appearance, there is no comparison between it and one of those golden deformities at present in vogue. It were no worse taste to change the peach-bloom of the cheek into mosaic of red, white, and blue, than to disfigure the mouth with parti-colored teeth. Some savage tribes do, indeed, take great pains to stain their teeth yellow, but at the same time they tattoo their faces. When we are ready for the last we may admire the first. But I believe that real culture and true refinement will not long tolerate it.

I regard adhesive gold as one of the greatest aids in modern operative dentistry. Contour fillings, in their proper place, are invaluable; but their proper place is *out of sight* among the bicuspids and molars. And even here this style of work has been carried to excess, and a gold tooth has often been built up where a diseased root should have been

extracted. But where exposed to view, and so much is built up of gold as to challenge the attention of all every time the lips are parted, these artificial teeth of gold offend all true taste. I know they are now in fashion. I know many dentists of high reputation advocate them. But I also know the great laws of *beauty* and *taste* are *still supreme*, and I believe a returning calmness of judgment will yet coerce us to their observance. In many of these cases pivot teeth would be quite as useful, and, at the same time, restore the mouth to its original beauty of expression.

The love of beauty is universal, and art must recognize it and minister to its demands. The oral cavity is not merely a *hole in the face*, through which ingesta are poured into the stomach. It is not merely a *mill* in which food is ground and triturated, better to fit it for chemical changes and final conversion into living tissue. The human mouth is a wondrous mechanism of useful beauties and beautiful uses. It is a palace of pearls with portals of ruby,—the central organ of that wonderful congeries of organs which constitute the human face the divinest part of "the human form divine." And when we proffer our aid for the restoration of its lost perfections, it should be with the high aim of art. The soul of all art is beauty. Eliminate this and our handiwork descends from the region of art to the plane of mechanics. Utility it must have, but beauty is its signet of perfection.

The Creator is nowhere content with the barren use, but with infinite art has filled the universe with beauty, and made it the glory of all his works. No artist can ignore it as a prime element of his work, and, upon us, whose art touches the divinest and most beautiful of all God's works, *its claim is supreme.*

PHYSIOLOGICAL ACTION OF NITROUS OXIDE GAS.

BY THOMAS W. EVANS, M.D., D.D.S., PARIS, FRANCE.

The marked resemblance between the effects produced by etherization and those resulting from asphyxia, was observed by the earlier experimenters with ether; and a few eminent physiologists at once expressed the opinion that etherization and asphyxia were nearly or quite synonymous terms. This opinion is not at present very generally entertained. Chloroform, ether, amylene, and their allies, have been pretty clearly shown to possess the power of producing effects peculiar to themselves, and this without any considerable interference with the process of hæmatosis. Since, however, the revival of the use of nitrous oxide, an attempt has been made to establish an identity between the condition occasioned by its inhalation and that consequent upon asphyxia.

I can call to mind no word in modern medical literature which is used with less definiteness of meaning, which is more frequently misused, than this word *asphyxia.* Andral objected to the term inflammation, because physiology had destroyed its etymological significance. Asphyxia—pulselessness—is now never used in its derivative sense, but as a synonym of apnœa, breathlessness. But even employed as a synonym of apnœa, the word asphyxia is wanting in precision and fails to represent a clearly defined pathological fact. Exact writers employ the word only to indicate the condition which arises from a supply of oxygen insufficient for hæmatosis. But it is very rare, if ever, that death occurs, except experimentally, simply from an insufficiency of oxygen. Gases possessing toxical properties, such as nitrous oxide, carbonic acid, carbonic oxide, sulphuretted hydrogen, etc., superadd when respired special physiological effects to those directly consequent upon an absence of oxygen. Again, in deaths resulting from a mechanical interference with the proper oxidation of the blood, such as strangulation and suffocation, we can never be quite certain that a want of oxygen was the uncomplicated cause of death. How large a factor is to be found in a *forced* retention in the blood of the pulmonary exhalations!

When Bichat defines death by asphyxia, as death from unoxygenated blood, consequent upon an arrest of the respiratory function, he defines a manner of dying, rather than a cause of death, and overlooks for the moment what he elsewhere recognizes, the immediate action of unoxygenated blood on the vital power of the brain. Indeed, I am inclined to believe that much of the confusion which obtains upon this special subject, has arisen from a too exclusive consideration of the way in which life apparently terminates in a large class of cases; and I believe this is to be the more regretted as in these cases the presumed way, if not positively erroneous, is at least by no means certain.

Understanding, however, by the word asphyxia, the condition which arises from an insufficient oxygenation of the blood, or from the accumulation in the blood of carbonic acid, I am by no means inclined to regard such conditions as identical with that produced by the inhalation of nitrous oxide. If there is a close resemblance between these states, there are also marked differences.

Nitrogen, when inhaled, is supposed to act upon the animal economy solely by the exclusion of oxygen. A knowledge of its physiological action is consequently of primary importance in the solution of the special question at issue. But its effect will be found to be quite different from those commonly observed after inhalation of nitrous oxide. Nitrogen, when taken into the lungs, gives rise to no feeling of exhilaration, but to malaise and a sense of impending suffocation, and only occasions symptoms of narcosis and insensibility after an interval of time considerably greater than that usually found necessary when

nitrous oxide is used. M. Collard de Martigny gives six, eight, and ten minutes, as the time which birds will live in an atmosphere of nitrogen or hydrogen. The time indicated in this statement I believe to be considerably exaggerated, as I have never been able to keep rabbits alive even six minutes, when deprived entirely of oxygen, and rabbits are much less sensitive than birds to interferences with the respiratory functions. Still, insensibility and death follow the inhalation of nitrogen less rapidly than when the animal is forced to breathe nitrous oxide, or is plunged into an atmosphere highly charged with carbonic acid.

In animals after death, following the inhalation of nitrogen, I have generally found less venous congestion, particularly of the portal system, than is to be observed after death from nitrous oxide. The blood is also lighter in color, and the liver more nearly normal in appearance. There is, however, one condition strikingly similar to that observable after death from nitrous oxide, the condition of the lungs; these organs are found neither voluminous nor collapsed, of a light pink or rose color, and generally with one, two, or more, small circular, well-defined ecchymotic spots, usually on their posterior surfaces. The spots average, perhaps, one-sixth of an inch in diameter. Their dark-brown color, their sharply cut borders, the presence often in their centres of small black nuclei, giving them a sort of *bird's-eye* appearance, render them sufficiently remarkable. These spots, the *ecchymoses sous pleurales* of French writers, are considered by Briand and Chandé as peculiar to death by suffocation, and as distinguishing "that *kind* of asphyxia from the asphyxia of drowning, hanging, and strangulation." The pulmonary tissue appears very slightly congested, and apart from the ecchymotic spots, and a very moderate accumulation of blood in the great branches of the circulatory vessels, the lungs, both in color and general appearance, more nearly resemble their presumed appearance in life and health than I have ever seen them after death produced by any other cause. This absence of evidence of local effects upon the lungs, following the inhalation of the two gases, is interesting not only as proof of the locally unirritating qualities of the gases, but as indicating that the phenomena consequent upon their administration are the results of subtle and profound modifications, which they effect in those vital forces whose harmonious relationship is essential to the continuance even of organic life.

The phenomena occasioned by the presence of carbonic acid in the blood are best studied by causing the subjects of our experiments to breathe an atmosphere charged with carbonic acid. The gas in a pure state is irrespirable. The mixture which I have used has generally contained about 30 per cent. of carbonic acid and 70 per cent. of common air. This mixture is quite respirable, and when inhaled produces

the peculiar effects of carbonic acid, loss of the power of motion, loss of conscious sensation, and finally, death. The insensibility is, however, not preceded by a period of excitement such as we witness during inhalations of ether, and more especially of nitrous oxide. I have several times inhaled this gas until insensibility was almost reached; the only pronounced sensation was one of intense discomfort, of suffocation, and of *horror*. This sentiment is also alluded to by M. Collard de Martigny as a personal experience, observed twelve minutes after he had been in a bath of carbonic acid, the lungs being freely supplied the while with fresh air through a long tube. It is possible that, if the percentage of carbonic acid employed in the mixture was considerably reduced, the peculiar feeling of suffocation occasioned by its inhalation might be less marked. Still, rabbits will live from half an hour to an hour, or even longer, in an atmosphere containing 30 per cent. of carbonic acid.

The anæsthetic state is much less readily induced by any respirable mixture of carbonic acid than by nitrous oxide. With rabbits an inhalation of nitrous oxide, continued about half a minute, will generally be found sufficient to produce a state of insensibility. If carbonic acid is used, two or three times as much time will be consumed in rendering the animal insensible. The anæsthesia produced by nitrous oxide is also generally much more persistent than that occasioned by carbonic acid. If a rabbit perfectly insensible from the respiration of carbonic acid is allowed to breathe fresh air five or ten seconds, he will have quite regained his consciousness and sensibility. When well under the influence of nitrous oxide, it is often half a minute before consciousness is apparently restored. I may remark incidentally, that with anæsthetics the rates of absorption and elimination by the lungs are measured by the rapidity of the circulation of the blood. In rabbits, according to M. Vierordt, the circuit of the blood is completed in about eight seconds; in men, in twenty-three seconds.

Again, the after-effects following a prolonged inhalation of carbonic acid are to be observed—the sense of weariness, the headache, the loss of appetite, nausea, etc.; none of these signs of nervous disturbance are commonly seen after inhalation of nitrous oxide. This is an important difference, not only practically, but physiologically. It is evident that a peculiar toxic impression is made by carbonic acid gas, which nitrous oxide fails to produce, either from special chemical or morphological changes occasioned by the presence of carbonic acid in the system, or from its less rapid elimination from the blood.

Apparent as these differences are, they are not as characteristic as those to be observed after death. In cases of death following the inhalation of carbonic acid, the congestion of the venous system is general, the blood is very dark, and the abdominal organs, the liver in particu-

lar, highly congested. The lungs, on the contrary, are collapsed, quite uncongested and very pale. I am aware that this description of the appearance of the lungs differs considerably from the statements of other observers. But the statements of other observers are chiefly remarkable for their discordance. Orfila says, speaking of the results of the inhalation of carbonic acid: "The tissue of the lungs is as it were swollen, and the veins are gorged with black blood," etc. Lallemand, Perrin, and Duroy describe the lungs as "voluminous and heavy, greatly congested," etc. According to Andrewski, Steinmetz, and Graefe, "the lungs are generally collapsed, and in color rarely differ from that of health." The last observation quoted agrees nearest with my own. I have, however, always found the lungs not only paler than in death, but decidedly anæmic; most of the blood having escaped from the capillaries into the main trunks of the pulmonary vessels; and I believe this condition will always be found—at least when carbonic acid has been inhaled, and by its local presence has excited a contraction of the muscular fibres of the capillaries and smaller vessels—which property of exciting contraction in muscular tissue, Brown-Séquard has shown to be one of its most constant physiological characteristics. A section of the lung tissue is followed by the flow of a little dark blood unmixed with air bubbles; this might be expected from the collapsed state of the lungs. After death from nitrogen or nitrous oxide, the lungs are moderately crepitant, and the blood which escapes from an incision is more or less full of gas bubbles. In case of death produced by nitrous oxide, the bubbles will be found in the bronchial ramifications mixed with mucus, and in one or two instances I have found the trachea filled with the rusty frothy fluid so common after drowning as to have been referred to by Dr. Riedell as almost pathognomonic of that cause of death.

A peculiar and interesting property of carbonic acid, first noticed by Ingenhousz and Beddoes during the last century, is its narcotic activity when applied to the tissues locally. I have not been able as yet to estimate in a very definite and absolute manner the local action of nitrous oxide. A jet of nitrous oxide directed upon a vascular surface causes at first a little contraction of the capillary vessels, followed soon by a moderate relaxation of their walls, an enlargement of the main trunks, and a development of the smaller branches. There is also apparently a diminution of sensibility. But the local effects upon the nervous and vascular systems are certainly less marked than those produced by carbonic acid when similarly employed.

The general physiological effects of nitrous oxide are too well known to be described in this connection, and I have already alluded to certain phenomena following its inhalation, as well as to those post-mortem appearances which I have considered characteristic and distinctive. The

rapid and powerfully *intoxicating* properties to which it owes a name, its transient hold upon the nervous system, and the absence of reactionary phenomena, are the subjects of everyday observation; while the healthy condition of the lungs, and the two or three small circular ecchymotic spots on the pulmonary surfaces are the most constant, as well as remarkable post-mortem facts. The venous congestion is greater than after death by nitrogen, and less than after death by carbonic acid; while the blood is darker than in the first case, and lighter than in the last. The right side of the heart is full of blood; the left side comparatively empty. The brain is apparently without lesions. Similar conditions of the heart and brain are seen after death from carbonic acid. In a word, the post-mortem appearances of the nervous and circulatory organs are those which writers, somewhat loosely, describe as common after sudden death. Had I time, I should be glad to present some of the chemico-vital differences to be observed between the particular actions of nitrous oxide and carbonic acid; whether the latter may have been introduced into the blood from without, or has accumulated as a result of imperfect elimination.

They both act upon the blood corpuscles in the same manner, darkening them; although in this respect the effect of carbonic acid is most striking. The lividity about the lips, and the darkening of the mucous surfaces, seen every day in the operating-room after administrations of nitrous oxide, are the results of this action. It can be witnessed experimentally, and perhaps more satisfactorily, by agitating a little fresh blood in an atmosphere of the gas.

The inhalation of nitrous oxide is followed by an increased exhalation of carbonic acid; so is the inhalation of ether, chloroform, etc. Soon, however, according to M. Buisson, if the inhalation is continued, the exhalation of carbonic acid falls below the normal proportion to be found in expired air. The primary causes of this reduced exhalation are evident. 1. The diminished rate and depth of the respiratory movements. 2. The enfeeblement of the heart's action, which is followed by a proportionate reduction in the quantity of blood which traverses the pulmonary tissue. 3. In the case of nitrous oxide, very probably, an actual reduction in the amount of free carbonic acid in the blood, from an absence of oxygen. For, while it is perfectly evident that nitrous oxide has a strong affinity for the blood corpuscles, that it may usurp the place of oxygen in them, and prevent for a time that combination of oxygen with the hæmatin upon which the red color of the corpuscles is presumed to depend, chemistry has not yet shown that it is decomposed in the blood, or exerts any of the chemical properties of oxygen on the constituent elements of the blood. In any event, to attribute the anæsthetic effect which follows the administration of nitrous oxide, to an accumulation in the blood of unexhaled carbonic acid, is at least illogical, so long as we know that the inhalation of

nitrous oxide is immediately followed by an increased proportion of carbonic acid in the products of exhalation, and at the same time that its direct action upon the nervous centres diminishes the rate of respiration and powerfully modifies the heart's movements. These effects upon the brain, upon respiration, and circulation, antecedent in point of time to the diminution of carbonic acid exhaled, are of primary importance in solving the special question: To what extent the insensibility consequent upon the inhalation of nitrous oxide is to be attributed to a retention in the blood of carbonic acid?

I have more especially endeavored, in this paper, to point out some of the differences existing between the toxical effects of nitrous oxide, and those seen after inhalations of nitrogen and carbonic acid: two gases which have perhaps the strongest claims to be regarded as asphyxiating agents; and I believe the differences indicated constitute sufficient proof that each one of the gases, when inhaled, acts upon the animal organism in a way specific and peculiar to itself. There is certainly a resemblance in the phenomena produced by inhalations of nitrous oxide, nitrogen, and carbonic acid. They seem each to strike at the brain, to destroy its capacity to act, and, finally, to render the functions of respiration and circulation impossible. This resemblance depends, doubtless, upon similar conditions established in the blood and in the nervous centres, effecting the metamorphoses of nutrition. But this is only a partial truth, which to be completed must be complemented by a recognition of those other conditions which differentiate the toxical phenomena.

Assuming that nitrogen possesses purely negative properties, that its destructive action is occasioned by an absence of oxygen, and an accumulation in the blood of uneliminated respiratory exhalations, producing a true asphyxia, carbonic acid acts in a similar manner, cutting off the supply of oxygen and checking exhalation. But this is not all. It superadds to a condition already incompatible with life, its own toxical action. In other words, to use a forcible expression of Béclard, "there is both asphyxia and poisoning." And this is also precisely the condition which obtains after inhalations of nitrous oxide, ether, chloroform, and other anæsthetics. The anæsthetic phenomena being induced by (*a*) specific toxical properties, which first stimulate, then narcotize, then destroy nervous action; by (*b*) an interference more or less marked with the oxygenation of the blood, and the consequent imperfect accomplishment of certain chemico-vital processes; by (*c*) a retention in the blood of a portion of the usual pulmonary exhalations. The two latter and secondary conditions always finally co-operating with the specific action of the anæsthetic in the production of narcosis, the arrest of enervation, and in the suspension of every functional movement; in a word, in the death of the organism.

(To be continued.)

DISINTERMENT OF THE REMAINS OF WILLIAM RUFUS.

Read before the Odontographic Society of Pennsylvania.

BY R. SHELTON MACKENZIE, D.C.L., PHILADELPHIA, PA.

Mr. President and Gentlemen,—William of Normandy, called the Conqueror, because he made himself master and monarch of England some eight centuries ago, was succeeded on the British throne by his second son, generally known as William Rufus.

Hunting in the New Forest, on the 2d of August, 1100, companioned only by Walter Tyrrel, the latter drew his bow at a stag; his arrow, striking a tree, glanced therefrom and entered the king's breast. William of Malmesbury, historian of the event, has recorded how, breaking off the shaft of the arrow, William falls from his horse, and "speaks word never more." Putting spurs to his steed, Tyrrel, the accidental homicide, hurried to the sea-shore, embarked for France, and joined the Crusade. In the pretty town of Lyndhurst (which gave a title to John Singleton Copley, the American-born lawyer who was thrice Lord Chancellor of England) is still shown an antique stirrup, which tradition, from time immemorial, asserts was attached to the saddle from which Rufus fell when struck by Tyrrel's arrow. A charcoal-burner, named Purkess, living in the village of Minstead, in the forest, discovered the royal corpse, and, assisted by some of his neighbors, put it on his cart and conveyed it to the City of Winchester. Mr. Charles Knight mentions, in his "Popular History of England," the best work of its class ever published, that in the village of Minstead, in the year 1843, he saw the name of Purkess over the door of a little shop; and Mr. Stewart Rose, a well-known man of letters, to whom Scott dedicated the first Canto of "Marmion," and who held an office in the New Forest, has recorded that the charcoal-burner's descendants have always lived in this village, where they still live, the possessors of one horse and one cart, and no more.

The body of William Rufus having reached Winchester, "it was committed to the ground within the tower." William of Malmesbury tersely adds, "attended by many of the nobles, though lamented by few." William was rapacious and unpopular. He had all the defects of his father, the Conqueror, without any of his great qualities, except courage, and was despised as well as hated. The scant respect shown to his remains is easily accounted for, and at all events, the French "Le Roi est mort," curtly announcing a king's death, followed by the equally brief "Vive le Roi," which hailed the new sovereign, has been virtually adopted by courtiers in many lands.

William of Malmesbury, who did not survive William Rufus fifty years, stated that he was buried in Winchester Cathedral, "in the midst of the choir, and within the circle of the tower." This tower fell within a year or so after that burial, and it was popularly believed to have

fallen on his tomb, as a judgment of Heaven for that so wicked a king should have been allowed interment in a place so sacred. What has long been known as the grave of Rufus is *outside* the circle of the tower, and therefore could not have been crushed and bruised by its falling. But then the evidence of Radborn, a monk of the cathedral, that it occupied a site within the circle two centuries after, corroborates the statement of William of Malmesbury. There being thus doubt, the Archdeacon of Winchester believed that, about the year 1540, in the reign of Henry VIII., when Winchester Cathedral was receiving many alterations, the tomb of Rufus, a large fabric of stone, might have been removed to the site it now occupies. Gale, the antiquary, accused the Parliamentarians, in Cromwell's time, of having "chested" the bones of Rufus—that is, placed them in one of the mortuary chests—adding: "In the tomb of William Rufus, which was broke open by the rebels in the time of the civil wars, was found the dust of that king, some relics of cloth of gold, a large gold ring, and a small silver chalice."

On Thursday, the 27th August, 1868, what has long been known as the Tomb of the Red King, in Winchester Cathedral, was opened in the presence of Archdeacon Jacob and several other local archæologists. The Archdeacon's object in ordering this to be done was to satisfy himself whether the tomb still contained the mortal remains of the Norman monarch, or whether they had been at some time removed and placed in one of the mortuary chests, as stated by Gale in his "Antiquities of Winchester Cathedral," published in 1715, and restated by Milner and other writers. Here let me state, as my authorities, an account of the tomb-opening in the *London Times*, a fuller narrative in the same journal by Mr. Henry Moody, Curator of the Winchester Museum, and letters from Mr. Albert Hartshorne and Archdeacon Jacob.

Mr. Moody, having stated why the tomb was opened, says: "The question has been solved. The tomb has been found to contain the skeleton of a man almost in its entirety, though much broken, and the fragments apparently thrown into the tomb by careless hands. The morsels of cloth of gold and the pieces of thin lead which were found, render it probable that the royal corpse was encircled by a costly cerement, and encased in metal of an enduring quality, strengthen the belief that it was the remains of him, of him only, of whom the poet says:

'Bled in the forest like a wounded hart.'"

He adds: "Outside the tomb, at its west side, are two round holes, which have the appearance of having been cut for the insertion of levers, which might have been employed in the removal of this heavy tomb from some other place," and, on very probable grounds, presumes that it had been so removed from within the circle of the tower, where

it originally was erected—*on* but not *in* the earth. He suggests that at the removal the corpse may have been "deprived of its royal robe and leaden covering, as, from its great weight, it would be more convenient to remove the cover, which of itself weighs nearly a ton, than to shift the whole at once; consequently, I suppose it to have been removed piecemeal, and the royal remains to have been thrown back into the tomb most irreverently, and in that random form in which they met my eye on Thursday."

Some golden ornaments, some fragments of golden tissue, a few bits of thin lead, a turquoise ring, a dog's or lynx's head, curiously carved in ivory, and a number of human bones, were found within the tomb. The shape of the bones was so clearly distinguishable at first that the width of the principal ones was measured, but they soon fell into what Archdeacon Jacob calls "some indescribable dust." But, and it is this fact which has induced me to trouble you with these details, several human teeth were found among the *débris*, in as good condition as if the Red King had died only yesterday, instead of 768 years ago.

Archdeacon Jacob, in his communication to the *London Times*, quotes a passage from a letter addressed to him by a friend and brother clergyman in Wiltshire, as follows:

"The examination of the ossa and reliquiæ (Rufus') affords a fresh confirmation, in one particular, of an opinion I have hitherto found in every instance corroborated, viz., that *the enamel of the human tooth is indestructible, except by the action of disease during life, or by the force of fire when the body has been burnt.* In my collection I have a part of a jaw-bone and two teeth *in situ*, which belonged to one of the soldiers of the Tenth Legion, and I have a tooth which once did good service among the molars of one of our good King Alfred's stalwart warriors in that time when he finally routed the Danes. The Roman soldier's body was burned, and no vestige of enamel remains; but in the case of Alfred's man of war the enamel is as perfect as it ever was; and in the instance of Rufus, I observe it is stated that nine teeth which he had left to him after grinding his subjects, are in perfect preservation."

In illustration of the reverend gentleman's remark on what he calls "the indestructibility of the enamel of the human tooth," permit me to add something from personal observation. The shortest line of steam communication, by railroad and packet-boat, between London and Dublin, is through the Island of Anglesea, a northwest county of Wales, and from the port of Holyhead, in Holy Island, close to Anglesea on the west, and connected with it by a railway bridge, just as Anglesea is itself connected with the mainland of Wales, by the famous bridge over the Straits of Menai. Near the harbor of Holyhead, and within view of the Stack lighthouses, is an overhanging cliff, called *Capel-na-Carrig*, which, in the Celtic language, means the

Chapel on the Rock. Tradition reports that a Druidical temple once stood on or near this precipice. It is very much exposed to the weather, and portions of the soil fall into the sea very frequently after a great storm. Visiting Holyhead, early in 1837, and compelled to remain there for several days, it was suggested that I should see Capel-na-Carrig. I found on the summit of this cliff an immense number of human bones protruding through the sandy soil, and at every step, a few touches of my walking-cane exposed a skull or some large bones. The bodies lay north and south, instead of according to the Christian practice of placing them east and west. All that I could learn at Holyhead was the belief of the country that, at some very remote period, there had been a battle on the island, and that the dead had been buried where I saw the bones. I collected several dozen human teeth, in excellent preservation, and a dentist in Liverpool, to whom I showed them, was so much struck with their fine condition, that he went to Holyhead soon after, and, he told me, secured a large basketful, which he made use of professionally—the art of making good artificial teeth being then very little known or practiced in England. Some time after, being in London, I gave several of the Capel-na-Carrig teeth to a then celebrated surgeon, Mr. Pettigrew, librarian to His Royal Highness, the Duke of Sussex, and famous for the great number of Egyptian mummies he had unrolled. He admired the perfect preservation of the enamel, and informed me that he had invariably found mummy-teeth in excellent condition, and that the discoloration from the vehicles used in embalming generally disappeared on exposure to the air.

Later still, when I was at Oxford, being very intimate with the late Dr. William Buckland, the great geologist, having mentioned the Capel-na-Carrig skulls and bones, he stated to me—not I to him—a belief that the enamel on human teeth was apparently indestructible, and that if ever an antediluvian man were discovered, the fact of his being *man* would be ascertained by his teeth; for (as he had seen by the fossil remains of elephant, rhinoceros, hippopotamus, bear, tiger, hyena, and sixteen other mammalia, discovered in a cave at Kirkdale, Yorkshire, in 1821) the enamel of the teeth of these lower animals was almost always in bad condition, and human teeth, under ordinary circumstances, were the reverse.

I have now concluded what I had to say, and beg that you will be so kind as to believe that I am here this evening to obtain and not to give information upon the highly interesting professional subject to which I have ventured to draw your attention. I, not a professional man, but interested from early study in subjects of medical science, wish to inquire from the members of this Society, who, I believe, can satisfactorily answer me—First, whether the enamel of human teeth is so indestructible as I have been led to believe; secondly, why it is so; and, lastly, whether and why the teeth of inferior animals are different.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

BY GEO. W. ELLIS, M.D., D.D.S.,
LATE PROFESSOR OF DENTAL PHYSIOLOGY AND OPERATIVE DENTISTRY IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 579.)

Before proceeding to notice the other affections traceable to disordered dentition, let us briefly review the anatomy and physiology of mucous membranes, as their implication constitutes an essential feature of most of them.

Mucous membranes are so termed from their secretion of a thick fluid which constantly lubricates their surfaces; they line canals, cavities, and hollow organs, and always communicate externally, in contradistinction to *serous* membranes, which line only closed cavities.

Bichat has divided them into two classes, the *gastro-pulmonary* and the *genito-urinary :*

"They consist of a dense connective tissue ramified by nerves, blood-vessels, and lymphatics; are covered upon the surface with several layers of epithelial scales, which are successively thrown off and renewed; they may, however, remain in some instances, and present under such circumstances as yellowish, brownish, or black masses.

"Their sensibility and susceptibility to functional and organic disorder varies in accordance with the source of their nerve supply and also with the age of the subject."

In infantile age the mucous membrane, from being suddenly exposed to influences unrealized during fœtal life, is in an injected condition, and prone to the occurrence of exudative, hemorrhagic, or suppurative lesions; one will not dispute that these disorders may originate in causes very remote from tooth protrusion, yet we contend that this is entitled to consideration as one of them, and hence worthy of study.

The gastro-intestinal canal of infants and children is very liable to disturbance from a variety of causes, as irritating ingesta, worms, sudden atmospheric changes, hot weather, scrofula, nervous disorders, etc., and last, though not least, *dentition*, for, during the eruptive period *proper* of a tooth or teeth, an abnormal condition of the intestinal canal is by no means a rare concomitant.

The part of this tract mostly affected is the mucous membrane alone, and the phenomena visible may vary in importance from a slight colic to obstinate vomiting, diarrhœa, constipation, or even organic dissolution of the part; the most commonly observed, however, are vomiting, diarrhœa, and constipation.

Vomiting, we remember, is a natural consequence of the anatomical formation and location of the infantile stomach; a slight pressure, shaking or tossing, or even a superabundance of food, being sufficient to

excite it; vomiting, however, here seems a misnomer, for it is simply an overflowing unattended with the symptoms of true emesis.

This condition may remain to an unnaturally late period from a persistence of the fœtal position of the stomach, or may be provoked by more grave causes, as obstinate constipation and consequent antiperistaltic action of the bowels, hernia, or invagination of the intestines.

When the function of the stomach becomes impaired or suspended through too much or improper food, it is termed indigestion, and is characterized by the discharge of either unchanged or imperfectly digested food by vomiting or stool. In the nature of the matter thus ejected we will frequently discover the cause of the difficulty; thus, if the milk is vomited in coagulated form *immediately* after being taken, it shows that either the milk or the stomach contained free acid; if, after being retained a short time, it is vomited in a state of loose coagulation, it proves that digestion is advancing normally, for this is really the first step in its progress; if, after some time has elapsed, it is thrown up unaltered, the digestive principle, "pepsin," may be judged deficient; or, lastly, if the caseous matter looks like tough mucus, we have reason to suspect the presence of catarrh of the mucous membrane of the stomach.

When the suspicions of gastric acidity are confirmed by the firm, sour-smelling coagula, benefit may be derived by adding a little bicarbonate of soda and chloride of sodium to each meal; not unfrequently, however, these dense coagula of milk may be retained and occasion intense colicky pains, and even convulsions, if not speedily discharged by vomiting. To prevent the recurrence of such difficulty, if supposed to be dependent upon gastric acidity, add some vegetable slime, as barley, oatmeal, arrowroot, etc., to prevent rapid and hard coagulation of the casein.

It seems reasonable to infer that any of these conditions may prevail through reflex irritation from dentition, and occasionally we observe an obstinate, nervous form of vomiting occurring simultaneously with various other manifestations of dental irritation, and ceasing only upon the subsidence or removal of the cause.

In all cases it becomes us to seek assiduously for the cause: if this be retarded dentition, employ measures to facilitate the process; if from repletion of the stomach, reduce the quantity of food; if from undue exercise after meals, enjoin quiet; if from improper food, change the regimen, etc. Further treatment will seldom be found necessary. If, however nausea and retching continue without free vomiting, we are advised to exhibit a gentle emetic of ipecacuanha; if considerable acidity of the stomach exists, give a dose of magnesia calcin., etc.; if the bowels be constipated, conjoin it with rhubarb in equal parts, or if diarrhœa be present, employ a combination containing creta præparata.

In acidity of the alimentary canal, Dr. Kuhn accords the preference to a formula containing aquæ ammonia.

When the vomiting can be associated with no perceptible cause, and is supposed to depend upon abnormal nerve influence, minute doses of wine of ipecac in water will often prove very prompt in its arrestation.

(To be continued.)

THE INHABITANTS OF THE MOUTH AND THE TEETH.*

BY SCHROTT, DENTIST AT MUHLHAUSEN.

Translated by Adolf Petermann, Munich, Bavaria.

(Concluded from page 629, vol. x.)

SPIRILLÆ.

SPIRILLÆ are a variety of the vibriones. They are found in hollow teeth, in which the saliva does not change daily. Very often some, with one or two windings, are found between the teeth and under artificial sets. No microscopical object stimulates the admiration of the spectator more than these little lines in the form of a screw, and which move, like living corkscrews, with immense rapidity forward and backward, without it being possible for the eye or the mind to conceive in what manner these relations are effected.

To have a very good view, it is necessary to cut out a little piece of damp caries from a newly-extracted tooth; put this in one or two ounces of distilled water, cover the vessel in such a way that the air has a little entrance, and keep these infusoriæ two or three weeks in this manner. After this time, if you take the caries out of the glass and put an adherent drop of water under the microscope, you will observe an immense quantity of spirillæ, which obtain from one to six windings.

AMIBIEN AND MONADS.

Because of the likeness of these infusoriæ to each other, it is very difficult to distinguish to what class they belong. They are both transparent, round or oval, granulated, but without a perceivable organization, contractible and expansible, whereby they change their forms essentially even as they draw in or stretch out a part of their body. Under artificial sets, which have not been cleaned for a long time, they are found frequently, but not so frequently in carious teeth, and between teeth on which we do not chew; they are very scarce on the "papillæ" of the tongue, on the gums, and on the mucous membrane of the mouth.

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* Deutsche Vierteljahrsschrift für Zahnheilkunde, iv. Heft, viii. Jahrg.

VOLVOX.

Quite a peculiar appearance is given by a sort of volvox, which is nearly always found in every mouth where the gum is not touched by the food, and where there is a white fur on the tongue; it is also found between the teeth and on the teeth which are used for chewing. Probably the Leucocyt, "globules muqueuses," have been mistaken for infusoriæ It may be that the secretion of the mucous membrane of the mouth may form such globulous figures, after it has been for a long time on the gum or on the contiguous structures, and has passed through certain changes. But, if we make a strict search, we will see that their contents are perfectly lively. From my own mouth I have seen the bursting of such slime-balls under the microscope, and the contents run out, full of living bodies, which divide with great rapidity in all directions in the surrounding fluid. The rest of the ball dissolves and disappears soon after. If these balls are an agglomeration of infusoriæ, like the volvoxes of Löwenheuk, Spallanzani, Müller, Ehrenberg, and Dujardin; or, if these animals have been formed in the slime-balls and metamorphosed by the rending of its common envelope, and the emission in another element, I have not yet succeeded in discovering. Nevertheless we find in these balls different degrees of cultivation. The larger and darker they are, the livelier are their contents; but they are also very near to bursting on their metamorphosis, wherefrom we conclude that they are generated under a common envelope, and regenerated by the throwing off of this envelope. Whether these young animals become again infusoriæ, like those from which they proceed, or whether they live, self-subsisting, as metamorphosed creatures, and propagate as such, I believe is not yet discovered with certainty.

THE FUR.

This white precipitate, which we can find daily upon the tongue, the gums, and the teeth, is composed of slime, saliva in the condition of decomposition, mixed with molecular granulation, epithelial cells, parasites, and living infusory worms.

THE TARTAR OF THE TEETH.

In reference to the tartar of the teeth, I allow myself to give here my own opinion. The naturalist, the physician, the chemist, and the microscopist, each examines the tartar of the teeth after his own method and manner. The one finds a structure like coral, formed by a polypus, whose surface resembles the infusoriæ, and whose interior is made up of lime precipitates of the same structure as mollusks and polypi. The others find the gum glands, which secrete the tartar which forms on the teeth, or conduct it as a simple precipitate from the fluid of the mouth, the food and the drink.

By chemical analysis, it is true, the tartar of the teeth is analyzed in its elements; but most of the chemists do not agree in their qualitative analysis, at least in their quantitative.

To notice all the theories about the tartar with which I am acquainted would take me too long, and would make some of these theories appear ridiculous. The microscopical authors themselves did not reveal to me a satisfactory result, until I was able independently to analyze the tartar of the teeth, and to distinguish it under the microscope.

It was not a little problem for me to analyze the tartar into its single constituent parts, and to know them; then the chemical, as well as the mechanical, separation of these little particles change in such a manner, that they are totally unrecognizable. At first I had to kill under several influences all these infusory worms, and to dry them, and compare their changed forms with those in the tartar to recognize them.

Although the tartar of the teeth is not always in the same condition, because its quantitative proportions differ very often, yet we can occasionally discover that its composition is the following: 60 per cent. infusorial rests; 10 per cent. vegetable products (parasites); 15 per cent. molecular bodies, to which we can add the limy precipitate of fluids of the mouth; 10 per cent. rests of the food and epithelial cells, and 5 per cent. in water soluble salts.

The tartar is also not formed by precipitate, as by precipitate I understand the separation and the deposition of dissolved hard bodies in any fluid. But the tartar is formed by cultivation little by little. It begins at first on the places where we have the smallest change of substances: under the posterior portion of the enamel of the incisors, or between the molars — especially where we find a decayed tooth which prevents the mastication on that side. These places are also the true places of meeting for the infusoriæ; here they remain the longest time, obtain their highest age, die, and their limy remnants interlace with epithelial cells, parasites, remains of food, slime, and secretion of saliva, and form, in this manner, the tartar of the teeth.

The best qualified tartar for observations is the soft one of young persons, because it is formed very quickly, and remains soft. If we observe the surface of a fresh loosened piece while we shave it off with a knife, and make it look like fur, diluted with water, under the microscope, we find the living infusoriæ, among which we find also many dead, together with parasites, epithelial cells, molecular granulations, and remains of food. When this first layer is carried off, and we shave and examine the same piece of tartar for the second time, we can still see quite clearly the dead vibriones. The parasites become by the needful trituration already shorter, and the epithelial cells unrecognizable. As we come deeper to the older layer, the harder it becomes, and

requires greater mechanical force to separate it, and the single parts get more indistinct. But there also, where the tartar of the teeth is perfectly petrified, several objects can be pointed out by a strict examination.

At our next meeting at Dresden, if it is granted to me to be present, I shall not fail to give living proofs that all these objects which are described here exist.

STAINING DENTAL TISSUES.

BY J. S. LATIMER, D.D.S., NEW YORK.

Encouraged by the interest manifested in the two stained specimens exhibited by me at the late meeting of the American Dental Association, which afford additional and most conclusive evidence, if needed, of the existence of the interglobular spaces in dentine, I have concluded to describe the method of their preparation, and add a few words with reference to their history.

In the summer of 1866 I procured the third edition of Beale's *How to Work with the Microscope.* His methods of injecting and staining animal tissues greatly interested me, and I immediately began to experiment with carmine. Muscular tissue, epithelium, dental pulps, bones and teeth were reddened with it, though not always successfully.

The carmine reddens only the nuclei or germinal matter, and as it has been claimed that the contents of the tubuli in dentine are simply germinal matter, I very naturally concluded that the so-called fibrillæ would be rendered more distinct and the question of their character would at the same time be brought something nearer a settlement.

With this object in view I made a section of a deciduous molar which had not been permitted to dry, and then soaked it in the carmine stain for some three or four days. From the staining fluid it was taken to pure glycerin, in which it was left for about a week, and then removed, wiped dry as possible, and immediately mounted in balsam.

This specimen is a thick one, and the stain was not well made, but the color penetrated the spaces, called by Kölliker "interglobular spaces." In the matter of the tubuli, however, I was disappointed.

Here let me give Dr. Beale's formula for his carmine stain:

Carmine,	10 grains;
Strong liquor ammoniæ,	½ drachm;
Price's glycerin,	2 ounces;
Distilled water,	2 ounces;
Alcohol,	½ ounce.

The carmine in small fragments is to be placed in a test tube, and the ammonia added to it. By agitation, and with the aid of the heat of a spirit-lamp, the carmine is soon dissolved.

The ammoniacal solution is to be boiled for a few seconds and then allowed to cool.

After the lapse of an hour much of the excess of ammonia will have escaped. The glycerin and water may then be added, and the whole passed through a filter, or allowed to stand for some time, and the perfectly clear supernatant fluid poured off and kept for use. This solution will keep for months, but sometimes a little carmine is deposited, owing to the escape of ammonia, in which case one or two drops of liquor ammoniæ to the four ounces of carmine solution may be added.

Of the manner of its operating, he says: "An alkaline solution of carmine passes *through the tissue,* comes in contact with the germinal matter, by the aid of which it is decomposed, and the carmine is deposited, so that it cannot be soaked out by the action of glycerin, as it may be from the matter of the tissue."

And he further says: "Some tissues are colored very slowly. Fibrous tissue, bone, and cartilage, even in very thin sections, will require twelve hours, or even more; but perfectly fresh, soft embryonic tissues, and very thin sections of the liver and kidney, thin sections of morbid growth, rich in cells, may be colored in half an hour, while the cells of the above structures, placed on a glass slide, may be colored in less than a minute."

Some months later I made a section of a recently extracted adult canine; stained it with a more skillfully prepared carmine solution, leaving it in the two fluids about the same time as in the other case, and mounting it in balsam as before.

The section was thinner, but after a time the globules of glycerin which now disfigure the specimen made their appearance.

I was gratified to find that though the stain did not show in the tubuli, yet it had penetrated the interglobular spaces, and rendered them visible even with a very low power. With a power of five hundred diameters, their outlines appear sharp and well-defined, rendering it easy to calculate their true shape and character.

Whether the result in these cases proves that the contents of these cavities are germinal matter I dare not yet say positively, but it certainly seems to do so. Further experiment is required to set the matter at rest.

Doubtless it would have been better had I mounted the section in glycerin instead of balsam.

The different stains more recently employed, each of which acts on only a single tissue, or if coloring more than one affects each differently, thus enabling us to distinguish nerve matter, formed material, germinal matter, and so on, are likely to greatly facilitate the investigation of animal tissues, and assist in adding greatly to our store of useful knowledge.

The first described section was exhibited to the Brooklyn and New York Societies of Dentists, on the occasion of Prof. McQuillen's lec-

ture on Interglobular Spaces, along with the specimens prepared by him. Subsequently, both of my specimens were shown to the American Microscopical Society of the City of New York, to the Brooklyn Dental Association, to the American Dental Association at Niagara, and by the above-named gentleman, recently to the Biological and Microscopical Department of the Academy of Natural Sciences at Philadelphia.

Among those who have thoroughly examined these preparations, I may mention Professors Joseph Leidy and O. W. Holmes, well known as competent microscopists.

In conclusion, let me recommend gentlemen to procure good microscopes, and with Beale's *How to Work with the Microscope* (4th edition), or Carpenter or Hogg on *The Microscope*, go to work to add to the common stock of knowledge.

SOAP AS A DENTIFRICE.

BY T. J. CROWE, MACON, GEORGIA.

AMONG all the fine soaps found generally in commerce, that from pure cocoanut oil, according to Kurten, is in most demand Cold water is generally made use of in all our ablutions, and this soap from the cocoanut froths equally well in cold as in warm water. To obtain it in its great purity it must be manufactured from the finest and whitest lye, and the best quality of Ceylon oil, which is dazzling white, of an agreeable odor, and without the slightest acid. In an able and well written article on "Dentifrices," by Dr. C. E. Francis, of New York, read before the Brooklyn Dental Association, April 4th, 1866, the author speaks highly of soap as a dentifrice, but objects to it on the ground that "it has not sufficient body" in a fluid state. When prepared as above, and used either in the fluid state, or from the cake, it presents a dentifrice superior in my estimation to all others. What is our object in using a dentifrice? To cleanse and preserve the teeth, says the author above mentioned. The microscope—that most valuable acquisition to the dental cabinet—reveals the fact that *soap does this more thoroughly than any other dentifrice.* I quote the following in confirmation of this opinion:

"Microscopical examinations have been made of the matter deposited on the teeth and gums of more than forty individuals, selected from all classes of society, in every variety of bodily condition, and in nearly every case animal and vegetable parasites in great numbers have been discovered. Of the animal parasites there were three or four species, and of the vegetable one or two. In fact, the only persons whose mouths were found to be completely free from them cleansed their teeth

four times daily, using soap once. One or two of these individuals also passed a thread between the teeth to cleanse them more effectually. In all cases the number of the parasites was greater in proportion to the neglect of cleanliness. The effect of the application of various agents was also noticed. Tobacco juice and smoke did not injure their vitality in the least. The same was true of the chlorine tooth-wash, of pulverized bark, of soda, ammonia, and various other popular detergents. The application of soap, however, appeared to destroy them instantly. We may hence infer that this is the best and most proper specific for cleansing the teeth. In all cases where it has been tried it receives unqualified commendation. It may also be proper to add that none but the purest white soap, free from discoloration, should be used."

These are startling facts. Let us labor then to impress upon our patients the importance of cleanliness. How many persons cleanse their teeth four times daily? Yet nothing less than this will keep these creeping, crawling, slimy parasites from the mouth Nothing less than this will even preserve the pearls that God has given to the loveliest creature in the land. "*Cleanliness* is next to godliness."

A CASE OF THIRD DENTITION.

BY R. S. WELLS, SPARTA, WIS.

All the upper teeth of Mr. S., who is about thirty-six years old, were extracted about four years ago, and a temporary plate put in immediately. As soon afterward as the alveolus was sufficiently absorbed, a permanent plate was fitted, which he has worn ever since.

Nothing unusual was manifested in the appearance of the alveolus until some time after this, when a tooth of the third dentition—the superior right cuspid—presented itself, and in a few weeks was extracted. The superior right bicuspid soon after appeared, and it too was removed; and then the left superior cuspid was erupted, and suffered in due time the fate of the others. Now there is a right superior central incisor about half through the gum, and it so seriously interferes with the fit of the plate that it must soon be removed.

There has been no pain complained of in the eruption of any of these teeth.

I shall watch this case with interest, and, if it is your pleasure, will report the finale of it. There is at present no signs of other teeth of the same kind.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF CONVENTION OF PENNSYLVANIA DENTISTS AND THE STATE DENTAL SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

In pursuance of a call issued some two months previously, the gentlemen delegated by the different local societies of this State to represent them in convention met on Tuesday, December 1st, 1868, at the Philadelphia Dental College, for the purpose, as stated in a circular, dated Lancaster, Pa., Nov. 16th, 1868, "of taking the initiatory steps and framing a Constitution and By-laws; also to make such provisions as may by them be deemed proper and necessary for securing the passage by the legislature in January, 1869, of laws chartering the institution and regulating the practice of dentistry in this State." The time mentioned in the circular was 10 A.M., at which hour there were quite a number of delegates within the College building, but those little preliminary courtesies of introduction and informal interchanges of views retarded the calling to order about half an hour.

On motion of Dr. S. H. Guilford, of Lebanon, Dr. John McCalla, of Lancaster, was elected president, and Dr. Geo. W. Neidich, of Carlisle, was chosen secretary of the convention. The former proceeded to state the objects for which they had assembled, and gave a short history of how, at a convention held at Litiz Springs, Pa., definite movement in this direction had taken place.

Prof. Truman, of Philadelphia, moved that a committee be appointed on credentials, and the Chair named this gentleman, with Drs. Breen, of Philadelphia, and Gerhart, of Lewisburg, who retired to receive the credentials of the delegates, and after a few minutes reported as follows:

Harris Dental Association—Drs. Jno. McCalla, Samuel Welchens, W. N. Amer, and J. Z. Hoffer.

Susquehanna Dental Association — Drs. M. D. L. Dodson, H. Gerhart, J. D. Wingate, and R. E. Burlan.

Cumberland Valley Dental Association — Drs. J. L. Suesserott, and Geo. W. Neidich.

Odontographic Society of Pennsylvania — Prof. C. A. Kingsbury, Drs. Wm. P. Henry, Wm. A. Breen, C. M. Curtis, S. S. Nones, M. Lukens Long, J. W. Moffitt, Wm. C. Head, Ambler Tees, and Thos. C. Stellwagen.

Lebanon Valley Dental Association — Drs. S. H. Guilford, W. H. Scholl, and W. K. Brenizer.

Pennsylvania Association of Dental Surgeons — Profs. T. L. Buckingham, Geo. T. Barker, and James Truman; Drs. E. R. Pettit, R. J. Huey, Spencer Roberts, John H. Githens, Amos West, E. T. Darby, Milton Keim, W. H. Trueman, Wm. Smedley, and Jesse C. Green.

Philadelphia Dental College—Prof. J. H. McQuillen.

Pennsylvania College of Dental Surgery—Prof. E. Wildman.

A motion was then made by Prof. McQuillen to appoint a committee of one from each society and college to draw up a constitution and by-laws, which being carried, the following gentlemen were selected: Drs. Amer, Dodson, Suesserott, Schott, and Stellwagen, and Profs. McQuillen, Wildman, and Truman. A written copy of their report was presented by their chairman, with the expressed understanding that they all held themselves at liberty to amend or criticise. The document had been compiled by one of their number some days before, in response to the requests of several of the gentlemen from the interior, who proposed such action as a means of expediting the business, and thus shortening the time which all would be compelled to remain away from their offices.

The whole report was read by the secretary; on motion, it was accepted and the committee discharged.

The compiler's name having been mentioned, he said that he was pleased to acknowledge, at this the most fitting moment, the great assistance he had derived from having similar instruments at hand, such as those of the American Dental Association, the State Medical Society of Pennsylvania, and the College of Physicians of this city; from which most of the clauses had been selected—*verbatim et literatim.*

The convention then decided that each section should be taken up, read, and acted upon separately.

A debate on the propriety of having permanent members as well as delegates to the State Society opened the action, and it was agreed to retain the words permanent members in the constitution, but that all legislative business should be transacted by the delegates. The convention then adjourned until $2\frac{1}{2}$ P.M.

Afternoon Session.

The meeting was called to order by the president, Dr. McCalla, and the reading of the constitution was resumed.

With the exception of a determined opposition on the part of some of the delegates to the five censors and their duties that the draft of the constitution provided for, there was a pretty unanimous action upon the plan of organization until the following clause was read:

"Article VII. Section 2. Any dentist or professor, who shall procure a patent for a remedy, *or instrument of surgery or dentistry, or who sells or deals in patent remedies or nostrums,* or who shall enter into a collusive agreement with an apothecary to receive pecuniary compensation for patronage, for sending his prescriptions to said apothecary, or who shall hereafter give a certificate in favor of a patent remedy, *or instrument,* shall be disqualified from becoming or remaining an active member of any local society entitled to representation."

Immediately upon its reading, amendments calculated to destroy the clause, and movements to drop it altogether, were made; a protracted debate ensued, in the course of which the clashing of such a law with the pecuniary interests of many, was the acknowledged reason for their attempts to erase it *in toto* from the constitution. On the other hand, it was as warmly supported by some who held that the time had arrived when, if dentistry was to make good its claims to a professional status, principle rather than mere lucre should ever be the guiding sentiment. The proposed State Society, and all the local societies represented by it, should recognize that to entitle the dentist to his claims as an educated, scientific practitioner of a specialty of surgery, who should be consulted upon all occasions of oral diseases and lesions, the profession must draw this distinction between those who practiced as such, and mechanics who on the one hand honorably labor for their hire; or quacks, on the other, whose sole ambition is the amassing of ill-gotten gains. The question was asked, how a practitioner of medicine, who is bound by a similar law to refuse to consult with any one who disregards it could, with propriety, hold professional intercourse with a specialist, who claims to be exempt from the laws of the mother profession?

The motion to adopt it being lost, several substitutes were offered and rejected. After a thorough canvass, the portion in italics was struck out, and the balance passed the next morning over a feeble opposition professing to be actuated by an objection to centralization of power in the State Society, which was claimed to be merely the creature of the local societies, and as such it was held that it could not be made a body to control them. This objection was promptly met by a reference to the whole object for which the society had been proposed to be formed, and the utter impossibility of accomplishing this, or securing unity or harmony of action, without some guiding and governing power.

The convention adjourned to meet the next morning at 9½ o'clock.

Wednesday Morning, Dec. 2d, 1868.

The delegates assembled, as per adjournment, at 9½ o'clock. The President called the convention to order, which at once went to work upon the constitution and by-laws, with the determination to settle all as promptly as could be done consistently with the importance of the work. By confining the debates more strictly to the subjects under consideration, before the morning session closed, it had succeeded in thoroughly sifting and completing the task. On motion, the constitution and by-laws were each adopted as a whole. After the following gentlemen had signed them and settled their dues, they proceeded to elect officers for the State Society:

Jno. McCalla, Lancaster; Geo. W. Neidich, Carlisle; Sam'l Welchens, Lancaster; Wm. Nichols Amer, Lancaster; J. Z. Hoffer, Columbia; M. D. L. Dodson, Williamsport; H. Gerhart, Lewisburg; Jno.

D. Wingate, Bellefonte; R. E. Burlan, Lewisburg; J. L. Suesserott, Chambersburg; J. H. McQuillen, C. A. Kingsbury, S. S. Nones, M. Lukens Long, Thos. C. Stellwagen, Phila.; J. W. Moffitt, Harrisburg; W. H. Scholl, Bernville; T. L. Buckingham, James Truman, Elihu R. Pettit, John H. Githens, Phila.; Jesse C. Green, West Chester; J. G. Templeton, New Castle; E. M. Pierce, Warren; A. B. Robbins, Meadville; Wm. Smedley, West Chester; Geo. T. Barker, Samuel J. Dickey, Phila.; W. K. Brenizer, Reading; W. A. Breen, W. H.Trueman, Phila.

The election resulted as follows:

President.—Dr. A. B. Robbins. *1st Vice-President.*—Dr. J. L. Suesserott. *2d Vice-President.*—Dr. Samuel Welchens. *Recording Secretary.*—Dr. Geo. W. Neidich. *Corresponding Secretary.*—Dr. Thos. C. Stellwagen. *Treasurer.*—Dr. Jno. McCalla. *Censors.*—Profs. J. H. McQuillen and James Truman, Drs. H. Gerhart, J. G. Templeton, and J. W. Moffitt.

Two gentlemen were appointed a committee to conduct the President elect to the chair, who made a few remarks on taking his seat.

On motion, a vote of thanks was unanimously tendered to the retiring President of the convention, for the admirable manner in which he had presided, and the convention then resolved itself into the State Society.

A motion was made that the Secretaries and Treasurer be directed to purchase the books required for their records, and it was distinctly stated that one, for the Recording Secretary to obtain, should be ruled for the signing of the names of the delegates to the constitution and by-laws, with separate columns for their societies and residences; the rough copy, as passed and signed, to be bound in the front of the book, being the original document; and this book to be open for the signatures of delegates then absent.

Prof. McQuillen moved that a committee be appointed to draft a bill to secure legislation, to govern the practice of dentistry in this State and to charter this Society. The chair named as this committee, Profs. McQuillen, Kingsbury, and Truman, Drs. McCalla and Moffitt.

The following gentlemen were then elected to serve with the Secretaries and Treasurer as a publication committee—namely, Profs. McQuillen, Buckingham, Truman, and Dr. Pierce.

After an invitation being extended, by the deans of the two dental colleges, to the members of the profession present, to visit those institutions, a motion was made and carried to the effect that, when this Society finally adjourns, it will be to meet in Harrisburg, at 10 A.M. on the second Tuesday in June, 1869.

The Society then adjourned until 3 P.M.

Afternoon Session.

The President called to order, and the Society at once elected Profs. Kingsbury and Buckingham, Drs. Moffitt, Brenizer, and Green as the Executive Committee.

The Committee on the Draft of Bill for the State Legislature reported, which being accepted, it was discharged.

The bill was taken up and proceeded with in the same manner as the constitution, and, singular to say, an important section making it obligatory upon all entering the profession after a certain period, to have attended the regular course of lectures and graduated from a respectable dental college, was stricken out. The following was finally passed by a vote of the Society:

"A LAW TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF PENNSYLVANIA.

"SECTION 1. *Be it enacted by the General Assembly of the State of Pennsylvania,* That it shall be unlawful for any person to practice Dentistry in the State of Pennsylvania for compensation, unless such person has received a Diploma from the faculty of a reputable Dental College, duly incorporated under the laws of this or some other State of the United States, or foreign country, or has obtained a certificate of qualification, issued by the State Dental Society; provided, that nothing in this section shall apply to persons now engaged in the practice of Dentistry in this State, before the first day of January, 1871.

"SECTION 2. It shall be the duty of the State Dental Society, at its first annual meeting after the passage of this act, to authorize the Board of Censors of the State Dental Society to act as a Board of Examiners, whose duty it shall be to meet at least once a year to examine all applicants, and, upon a satisfactory examination, shall recommend the applicants to the State Society, as entitled to receive a certificate of qualification to practice Dental Surgery within the jurisdiction of this State.

"SECTION 3. To provide a fund to carry out the provisions of Section 2, it shall be the duty of the Board of Examiners to collect from all who receive the certificate to practice Dental Surgery, the sum of Thirty Dollars ($30) each, of which sum, if there be any remaining after liquidating necessary expenses, shall be paid into the Treasury of the State Dental Society, to be kept as a fund for the more perfect carrying out of the provisions of this law, and to remunerate the Board of Examiners, they shall receive Ten Dollars ($10) a day from the above fund for each day of actual service.

"SECTION 4. Any person who shall practice Dentistry without having complied with the regulations of this act, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than Fifty Dollars ($50) nor more than Two Hundred Dollars ($200) for each offense; provided, that nothing in this act shall be construed to prevent physicians and surgeons from extracting teeth.

"SECTION 5. All prosecutions under this act shall be by indictment before the Court of Common Pleas in the county where the offense was

committed, and all fines imposed and collected under the provisions of this act shall be paid into the Treasuries of the Poor Fund.

"SECTION 6. This act shall take effect and be in force from and after its passage."

On motion, the following committee was appointed to secure the passage by the Legislature of this bill, Drs. Moffitt, McCalla, and Brenizer, which committee was also instructed and authorized to make application for the incorporation of this Society.

The Committee on Publication was then authorized, by a motion of the Society, to draw upon the treasury for a sum not exceeding twenty-five dollars, to be used for the purpose of printing this bill together with the constitution and by-laws.

The Society now adjourned until the second Tuesday of June, 1869.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY T. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

THE Society met at the Philadelphia Dental College, Wednesday, November 18th, 1868, according to resolution of previous evening, to hear Prof. A. Melville Bell, F.E.G.S., F.R.S.S.A , Lecturer on Elocution in University College, London, England, and author of several works bearing upon the subjects treated of from his Chair.

This gentleman described and illustrated his invention of "Visible Speech, or Self-Interpreting Letters of all Languages." The lecture, which was of over an hour's duration, was listened to with marked attention and evident pleasure by the members of the Society and students of the Philadelphia Dental College. At the close a vote of thanks was unanimously carried.

Time and space permit but a limited review of the discourse. The whole subject seemed to be based upon an intimate acquaintance with the anatomy and physiology of the parts concerned in the formation of sounds; the latter are represented by various signs, as straight lines for vowels, curved for consonants, etc., which in combination are designed to indicate the position and movement of the anatomical parts. With these signs he was enabled, by systematic modifications, to represent many hundred changes, being more than enough for all the sounds which the human voice is capable of making.

The alphabet at first sight seemed, like all phonetic letters, very intricate and difficult to understand; it was soon rendered familiar to those present by pointing out the key sounds and their symbols. At the request of the lecturer, many of the names and sounds of the letters were made by gentlemen who had not seen them more than half an hour before, and never had heard them pronounced.

Upon the whole, it might be taken as a systematic insight into

much that is required to be understood by operative and mechanical dentists, to enable them to preserve, or restore in the most natural manner, the parts of that most complex and delicate series of structures, which are necessary to the formation and enunciation of articulate speech, and which are placed under the immediate supervision and care of practitioners of dentistry.

The Society then adjourned.

Tuesday evening, December 1st, 1868, being the regular monthly meeting night of the Odontographic Society, the delegates to the State Dental Convention were invited to a *conversazione* given by the Society, at the residence of the President, Prof. McQuillen, where they were met by a number of the representatives of our own and other liberal professions; among these were Profs. Gross, of the Jefferson Medical College; Allen and Wood, of the University of Pennsylvania; Dr. J. Gibbons Hunt, Messrs. Walmsley, Starr, and other members of the Biological and Microscopical Department of the Academy of Natural Sciences. The bench and bar were represented by Judge Pierce, U. S. District Attorney Valentine, Messrs. Guillou, and others; the press by Drs. R. Shelton Mackenzie, Geo. J. Ziegler, and Mr. F. Welles. There were also present the students of the Philadelphia Dental College, among whom we were pleased to meet gentlemen not only from every section of our own country, but from many quarters of the civilized world—Canada, Nova Scotia, Cuba, France, Germany, and even China.

To add to the interest of the occasion, Dr. Hunt and Messrs. Walmsley and Starr had kindly brought by request a number of very fine and rare microscopical specimens prepared by them. These, in addition to sections of bone, teeth, and other organs illustrating human and comparative anatomy, belonging to the President, were exhibited under a number of microscopes, furnished by gentlemen interested in the study—Mr. Walmsley's being one of the most complete of Zentmeyer's grand instruments, with accessory apparatus; Mr. A. C. Cogswell's, of Nova Scotia, one of Robins' manufacture, of London, England.

There were also the army pattern and Beale's class microscope of Zentmeyer's make, both in use by the college; the latter of which had been very liberally presented to Prof. McQuillen, to illustrate his lectures in the institution, by Dr. Jas. McManus, of Hartford, Connecticut.

Three objectives made by Wales, of Fort Lee, N. J., one inch and a half, two-thirds of an inch, and one-fifth of an inch, the latter with adjustment for thin glass covers, the property of Dr. S. S. White, were used with advantage in connection with one of the instruments.

Mr. Walmsley exhibited the following objects, which he thus described:

Wolffia Columbiana, the smallest of true flowering plants. It has but recently been discovered in the United States, and has not been

seen in flower by any observer in this locality. These specimens were rendered transparent, inclosed in a cell, and rolling about freely in the fluid with which it was filled. They exhibited very perfectly the cellular structure of the plant, its mode of propagation, with the young plants budding from the parent, or separated from it, leaving a considerable cavity within, and starting out in life on their own account. The specimens seemed to attract much attention from the scientific gentlemen present.

Leaf of the Drosera Rotundifolia, or Sundew. This specimen was also mounted within a cell, showing very perfectly the glandular hairs or bristles which secrete the viscid fluid with which the leaves are covered, which, being tenacious enough to hold any unfortunate fly or mosquito which may alight upon it, has given rise to the popular notion that *these plants eat flies.*

Flower of the Houstonia Cerulea, or Quaker Lady, exhibiting probably as much of flower structure as could possibly be combined in one. The general form and color of petals, calyx, and other parts were well retained; yet it was prepared so as to render examination of details with an eighth objective perfectly feasible. The ovary and ovules, sessile stamens, stigma, style, and pollen grains were all distinctly shown. Clorophyll grains in cells of the calyx, and spiral vessels traversing the petals, were beautifully visible, while the whole surface of the latter was covered with minute papillæ. These were all shown with ordinary transmitted light; by aid of the polarizer the bundles of Raphides studding the petals and calyx were shown in gorgeous colors. (This flower is recommended to teachers and others by Mr. Walmsley as a representative one.)

Cuticles from leaves of the India-rubber tree, the oleander, and from the Buxus Sempervirens, showing stomata: in the former very large and covered with a protecting net-work of fine hairs. A transverse section of the same leaf (India-rubber) was also exhibited, showing the stomata with the protecting hairs dipping down into the body of the leaf.

Specimens of Bartramia, Bryum Pyriforme, Funaria Hygrometrica, F. Serrata, and other mosses were shown, with natural colors perfectly preserved, and exhibiting rootlets, leaves, capsules, operculum, peristome, and spores very perfectly; also a slide containing in cell, opercula and annulus from Funaria Hygrometrica.

Gizzards of katydid and cricket, spinneret of geometric spider, pygidium of flea, stigmata and trachea of louse, with mosquitoes, male and female, notonecta, and other specimens of whole insects were also shown.

Mr. Starr's specimens were mainly of insects, and, like the preparations of the preceding gentleman, commanded the admiration of those present. We regret to be unable to present a detailed account of them. They afforded most excellent views of the respiratory, circulatory, mas-

ticatory and digestive apparatus of insects, among which were noticed in particular the Pediculus Capitis (louse), in which the stigmata and trachea were clearly demonstrated by means of coloring matter, and making this disagreeable creature quite a beautiful object under the microscope; the Acanthia (bed-bug), showing the arrangement about the mouth; the multiple eyes of the fly, the lancet and suctorial apparatus of the mosquito, and the gullet and gizzard of a cricket, with a small spider in the former.*

Dr. Hunt's specimens were chiefly injections.

These objects were examined with considerable interest and satisfaction; after which the gentlemen partook of a collation, and separated at a late hour, expressing themselves much pleased with the entertainment.

Tuesday, Dec. 8, 1868, the Society met at the Philadelphia Dental College, with a large attendance of the members and others.

The President introduced R. Shelton Mackenzie, D. C. L., who read a paper on the "Disinterment of the Remains of William Rufus."†

After the reading, on motion of Dr. Nones, a vote of thanks was tendered to the essayist, and a copy requested for publication.

In response to the questions at the close of the doctor's paper, Prof. McQuillen directed attention to the relative density of enamel, dentine, and cementum in man and animals, describing at considerable length their microscopical characteristics, and the relation which these different tissues bear to each other in man and the carnivora and herbivora, illustrating the same by skulls, models, drawings, etc. The fact of the human enamel having three parts of organic to ninety-seven parts of inorganic, would account for its extreme hardness and durability, not only during life, but for extremely long periods after death, as in the case of mummies, etc. With respect to the relative chemical composition of the dental tissues in the various orders of animals, he did not feel warranted in expressing himself as freely as he had upon their microscopical structure, as it was a subject to which he had not paid much attention, and he was not aware of any one who had instituted a series of analyses in this direction. He was disposed to think, however, that the durability of human teeth after death, in comparison with animals, was to be attributed mainly to the care with which the remains of man are entombed by his fellows rather than to a marked difference in chemical composition.

It is a well-known fact in palæontology, that the bones and teeth of

* Messrs. Walmsley and Starr are actively engaged in business, and the microscopical preparations made by them are the results of leisure hours in the evenings and other odd moments which so often hang heavily on the hands of some people. J. H. McQ.

† See page 13.

animals, buried in the primeval mud, have been preserved in the rocks from the earliest periods of creation. Animals in our own day, however, dying in the fields, and falling upon the surface of the earth, their bones and teeth subjected to the variations of temperature, alternations of moisture and dryness and the general vicissitudes of atmospheric influences, are soon decomposed into their original elements. The bones and teeth of man, under similar influences, would in course of time meet with the same fate.

In response to a question on the part of one of the audience, with respect to the relative durability of the teeth of the people of America in comparison with those of other nations, the speaker said that if really true, as stated by some, the cause must be looked for in climatic influences and our diet and habits. In a recent paper Prof. Holmes, in writing on health and disease, has directed attention to the fact that the washerwomen of England and Ireland, on coming to this country, find that their clothes dry much more rapidly here than in the old country, owing to the dryness of our atmosphere in comparison with the humidity of theirs. That this may be an important external cause among others, exerting an injurious influence on the teeth, is a reasonable inference; for alternations of dryness and moisture, heat and cold, cannot but exercise, in connection with other exciting causes, a deleterious influence upon teeth *predisposed* to decay by defective structure.

At the close of these remarks, the speaker stated that he had continued his investigations through the past three months on the action of anæsthetics, and in the presence of a number of gentlemen had kept one of the rabbits, experimented on some months back, under the influence of nitrous oxide, and in a *complete state of narcosis* for a period of one hour and five minutes. He had also made the action of anæsthetics on the blood-corpuscles a careful subject of study during this interval, and had been unable to find that marked change in the blood-corpuscles which had been assumed to take place by certain English writers. The blood-corpuscles of man, the rabbit, pigeon, and frog, prior to their being placed under the influence of anæsthetics and afterward, were exhibited under microscopes, and the absence of any change made evident to all.* In conclusion, the examination of blood in cases of murder was dwelt upon at considerable length, and the difference, in the shape and size of corpuscles, of mammals, birds, fishes, reptiles, and batrachians, illustrated by the specimens already exhibited. Attention was directed to a serious error in a recent American edition of *Taylor on Medical Jurisprudence*, in which Prof. Leidy was erroneously credited with testifying, in a case of murder, from a microscopical examination of the blood, alleged by the accused to be chicken blood, that the assertion was false, and the blood was that

* A paper, embodying a description of these examinations, will be published in the February number of the Dental Cosmos. J. H. McQ.

of a human being; the true state of the case having been, that Prof. Leidy, although denying the fact of its being chicken blood and admitting that it was mammalian, did not feel justified in asserting, when the life of a human being was at stake, that it was undoubtedly human blood. The meeting then adjourned.

EDITORIAL.

STATE DENTAL SOCIETY OF PENNSYLVANIA.

In another portion of the magazine will be found a report of the proceedings of the State Dental Society, the attendance on which was quite as large as could have been anticipated, and the proceedings of which were characterized by harmonious action, although there was quite a diversity of views upon some important points. The business of the meeting was very much facilitated by a plan of organization prepared, in anticipation of the session, by Dr. T. C. Stellwagen, which with some slight modifications was adopted as the Constitution of the Society. Its consideration, item by item, necessarily occupied the greater portion of the session. Having accomplished this, the primary object which induced the organization of the Society received due attention, viz., the preparation of a plan to be submitted to the Legislature to regulate the practice of dentistry in the State. The one presented by the Committee to the Society was very warmly discussed, and a change made in it of such a decided character as to render the movement, in the estimation of the writer, almost entirely nugatory, by the erasure of a provision making it obligatory on all engaging in the practice of dentistry in the State, *after* a certain period, to have *attended the regular course of lectures and graduated from some respectable dental college* in this or some other State. This the Society would have been perfectly justified in asking of a Legislature which has chartered two dental colleges, and is, therefore, bound to promote their interest and control their action. A law such as this, *prospective* in its action, and intended to influence those entering the profession in the future, would certainly have been satisfactory to the profession in general, by making a *collegiate education obligatory* upon all persons who shall enter its ranks, and this would have been promptly created a law by the members of the Legislature. The propriety, however, of attempting to regulate the action of those who have been engaged in practice for a number of years, with credit to themselves and benefit to others, is of very doubtful expediency. It is difficult to see, indeed, what advantage can accrue to the profession by making it obligatory upon them to procure a certificate or diploma, unless the latter shall be an evidence of having attended lectures, submitted to a satisfactory examination, and graduated

from some respectable institution. The views herein advanced have been presented by the writer in the pages of this magazine on former occasions; believing them founded in equity and reason, they are again offered, although differing from the course adopted by the majority of the Society.

J. H. McQ.

SOUTHERN DENTAL ASSOCIATION.

In the *Canada Journal of Dental Science* the following remarks are presented by the editor of that excellent journal: "The *American Journal of Dental Science* suggests the organization of a Southern Dental Association; one confined to the late slaveholding States, and which would meet in one of those States. 'The impression has become general among Southern dentists that a *sectional feeling* governs the action of the majority of the members of the American Dental Association; and on account of such a feeling as this being manifested at every meeting, they decline attending.' We regret to hear of any such *political* feeling arising to sever the connection between American dentists in the American Dental Association. The eminently practical character of its conventions, and the respectability of its officers, have made it an institution of great value, and we have always believed 'the majority of its members' to be guided by a liberality which was never yet openly disputed, and a *loyalty*, which, if we commend it in our country and in our own associations, we must consistently commend in the neighboring country and the American Dental Association."

The October number of the *American Journal of Dental Science*, in which the proposition to form the Southern Dental Association was published, has not been received by the writer, so that he is unacquainted with all the views advanced by the author of the article from which the above extract was made.* It would be unjust, however, to the American Dental Association to permit such an unfounded statement as that a *sectional* feeling has governed the action of a majority of its members, to pass unanswered.

To refute this, it is only necessary to turn to the election of officers during the past few years, as evidence that *sectional* feeling has not controlled its action in the slightest degree; for, if anything of the kind had prevailed, it would have been made manifest in their selection. Thus, immediately after the war, at the fifth annual meeting, held in 1865, at Chicago, Prof. C. W. Spaulding, of St. Louis, Missouri, was elected President; the following year, 1866, at Boston, two candidates from the South, Drs. W. H. Morgan, of Nashville, Tennessee, and J. S. Knapp, of New

* This article was prepared for the December number of the Dental Cosmos, but too late for publication. Since that the October number of the *American Journal* has come to hand. There is nothing in it, however, which demands any modification of this article.

Orleans, Louisiana, were nominated for First Vice-President, and the first-named was duly elected. The next year, 1867, at Cincinnati, Dr. S. Talbot, of Lexington, Kentucky, was elected Second Vice-President, and Dr. W. H. Goddard, of Louisville, Kentucky, Treasurer. At the meeting held at Niagara this year, Prof. J. Taft, of Ohio, and Dr. W. H. Morgan, of Nashville, Tennessee, were nominated for the presidency by the Executive Committee, and the last-named gentleman withdrew from the canvass, as he expressed an unwillingness to run in opposition to his old friend, who had served the Association so long and so faithfully. Of the *six* officers of the Association elected at Niagara this year, *three* are from the "late slaveholding States," as follows: First Vice-President, Prof. Homer Judd, St. Louis, Missouri; Recording Secretary, Dr. Edgar Park, St. Louis, Missouri; Treasurer, Dr. W. H. Goddard, Louisville, Kentucky. The members of the standing committees, in addition, have always been selected without reference to place of residence, but with the view of a proper discharge of the duties. The evidence thus presented of the absence of sectional feeling is overwhelming, for although the attendance on the part of Southern practitioners has been limited, for other reasons than that given above, the proportion of officers each year has been decidedly in *their favor*. This has not been the result of mere accident, but preconcerted action on the part of the Northern members, in the endeavor to do their share toward establishing and maintaining harmonious action on the part of the profession in every section of our country. As evidence of this, I quote the following extract, from remarks made by the writer when responding as presiding officer of the Association, to the addresses of welcome at the opening of the Chicago meeting:

* * "We have come hundreds of miles away from home; let each and all therefore turn out the silver lining of their manhood, that everything may be bright and cheerful, and nothing occur to disturb the harmony or interfere with the usefulness of the meeting. Let no personal misunderstanding or local difficulties, if there are such, be apparent here. In addition to the objects which the Society has in view, it should be remembered that every association *based*, like it, on the *representative* system, whether established for the advancement of science, of religion, or the general good of humanity in other directions, are so many *links* in the *chain* calculated to bind together in the strongest manner possible every section of our beloved Union. If for no other reason than this, the cultivation of harmony is ever desirable."

Year after year the olive branch has been cordially extended by the Northern members of the Association to their professional brethren in the South, and those who have attended the meetings from that section, and *participated* in the proceedings, will acknowledge that other matters than sectional or political questions have fully engaged the time and attention of the delegates.

In conclusion, the writer does not wish to be understood as taking exception to the formation of a southern dental society, but to the reasons assigned for forming one, which, as has been shown, are unfounded. The right of members of the profession to organize associations whenever and wherever they please, is beyond a question of doubt; and the more there are the better for the profession and the community. To secure success and perpetuity, however, such organization should be formed upon a truly catholic basis, and with but one object—the advancement and elevation of the profession as a whole. When a body of professional men are to be brought together, however, with the view of scientific advancement, merely because they happen to agree upon political or religious questions, and hold aloof from all who may be *supposed* to differ with them on those points, the probability of such movements accomplishing much in the direction of science is exceedingly doubtful.

Without inquiring into the motives prompting one to make such erroneous statements as those quoted, it may not be amiss to reiterate that the cause of science, the interest of our profession, and the general good of humanity, are promoted by the annual gathering of men from every section of our wide-spread country who are interested in some special department of study; and only those of contracted views hold aloof from or oppose such association. In place of fostering sectional feeling, the aim of all should be to let the dead past bury its dead.

J. H. McQ.

OBITUARY.

We regret to be informed of the decease, on Friday, Dec. 11th, of Dr. B. Frank Mills, brother of Geo. H. Mills, of Brooklyn. Dr. Mills was twenty-four years of age, had been engaged in the study of dentistry several years, and graduated from the Ohio Dental College in the spring of this year. He was a young gentleman of pleasing manners, and animated by the laudable desire of properly fitting himself for the profession. The fatal disease which terminated his existence was phthisis. His remains were interred at Worcester, Mass , on Dec. 14th.

BIBLIOGRAPHICAL.

Circular No. 1. War Department, Surgeon-General's Office. Report on Epidemic Cholera and Yellow Fever in the U. S. Army during 1867. pp. 155. Washington: Government Printing-office. 1868.

A copy of this valuable circular, prepared by Brevet Lt.-Col. J. J. Woodward, Assistant Surgeon, U. S. A., has been received from the

Surgeon-General's office. The extracts from official reports are quite voluminous and full of interest. From these data important conclusions have been drawn, which are of interest to every one, viz.: favoring the doctrine of the portability and transmissibility of the two affections, and that the maintenance of a strict quarantine, in conjunction with hygienic precautions, are the most effective means of preventing their development, while the prompt removal of any command exposed to these pestilences to some healthy, rural site, is the most effectual means of preventing them from spreading to any extent among the troops. The discipline maintained in the army, by which the movements of any single man, or bodies of men, and the time and place where any affection first makes its appearance, can be accurately known, gives a degree of authority to the conclusion arrived at, which the ordinary statistics of epidemics, or contagious diseases in other communities, do not warrant.

J. H. McQ.

SELECTIONS.

RUBBER SUITS.

OPINION—Leavitt, J.

Extract from Decision of Judge Leavitt, in case of H. C. Goodyear, et al., *vs* Drs. Berry, Taft, and others, of Cincinnati. Nov. 1868.

"I can have no hesitation, therefore, in holding that the use, for dental purposes, of hard rubber plates, made under the Simpson patent, is an infringement of the Nelson Goodyear patent; and in no aspect of the case is the defendant relieved from liability as an infringer by asserting the use of the product under the Simpson patent. While it is probably true that Simpson has made a valuable discovery in introducing into his compound an ingredient which, by its vaporizing properties, prevents the unpleasant taste and odor of the vulcanized rubber, when used as plates for artificial teeth, and for this invention may have been well entitled to a patent, he or his licensees are not protected in the use of the process and the product as claimed by and patented to Nelson Goodyear.

"I may remark, in closing, that I am fully sustained in this conclusion by the opinion of Judge Blatchford, District Judge of the United States for the Southern District of New York, in the case of Goodyear *vs.* Evans, recently before him, on an application for an injunction to restrain the defendant from the use of hard rubber made under Simpson's patent, as an infringement of the Goodyear patent. In a printed opinion of the learned Judge, now before me, the question is ably discussed, and the conclusion attained that it was a proper case for an injunction, which was accordingly granted. After noticing the claims of the two patents, and reviewing the testimony as to the infringement, the learned Judge says: 'Nothing more is needed to establish clearly that the use of the Simpson vulcanized product is an infringement of reissue No. 557, and that the manufacture of it by the Simpson process is an infringement of reissue No. 556. Concurring, as I do, in this conclusion, a decree for the complainants will be entered.'"

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Experimental Investigations on the Antidotal and Revivifying Properties of Nitrous Oxide.* By Geo. J. Ziegler, M.D."—[In view of their important practical bearing upon the treatment of narcotic poisoning, asphyxia, and suspended animation generally, we present the following extracts from a paper published in the *Boston Med. and Surg. Journ.*, Dec. 8th, 1852, and reproduce entire the succeeding article of a later date, with a brief record appended of a case never before reported.]

"To render these experiments more reliable, and the evidence therefrom as conclusive as possible, I adopted the following method of investigation, viz., firstly, making a *test* experiment, by poisoning or otherwise asphyxiating the animal, and then employing the remedy for its recovery; and, secondly, a *comparative* experiment, which consisted in placing the same animal, by the same means, in a similar condition, though for fear of a fatal result, never permitting the asphyxia to become so great as in the former instance, and then trusting exclusively to the vis vitæ for a spontaneous recovery. The object of this comparative experiment was to obtain more correct data for the explanation of the phenomena presented, and to qualify the evidence afforded by the preceding, and, as far as possible, to exclude all sources of error, it was never instituted until after complete recovery from the effects of the latter, always allowing sufficient time for that purpose, generally from twenty-four to forty-eight hours.

"Expt. I. *Carburetted Hydrogen.*—A dog was confined in a close vessel, and the common illuminating gas, taken directly from the pipes, introduced therein through a suitable orifice. After a brief period (the time was not noted) he was brought fully under its poisonous influence, and when taken out and thrown on the floor appeared to be quite dead; his body and limbs being somewhat extended, indicative of the rigor mortis; innervation, respiration and circulation having apparently been completely and permanently suspended. The nitrous oxide water was now injected into the bowels, and notwithstanding the profound asphyxiation, returning animation was speedily manifested by respiratory efforts, which rapidly increased to very strong and prolonged ones, similar to those produced by the direct introduction into the lungs of the gaseous protoxide of nitrogen. This exalted respiratory action, however, subsided into the more tranquil and natural effort soon after the cessation of the injection. Also during and after the injection other evidences of the aroused vital excitability were presented by vomiting and purging, followed by the ordinary and more striking signs of returning animation. Consciousness was soon apparent, and manifested by the wagging of the tail in response to our calls, and some time before voluntary power had sufficiently and generally returned to permit the elevation and support of the body in an upright position. In less than twenty minutes the animal could, by coaxing, be induced to exert himself, though the locomotive efforts, at first, were very unstable, and not under full voluntary control. This power, however, rapidly returned, and before the

expiration of one hour his energies were fully restored, and he was as actively and voluntarily exercising and eating as if he had not been subjected to any experiment whatever—not appearing to suffer in the least from the poisonous effects of the carburetted hydrogen. The quantity of the nitrous oxide water used in this experiment, and introduced into the animal's body per anum, was about one quart.

"Expt. II. *Comparative—Carburetted Hydrogen.*—About twenty-four hours subsequently, the same dog was again confined and subjected to the poisonous influence of this same agent. The asphyxia was not, however, suffered to become so profound as in the former instance. After, therefore, an incomplete and partial asphyxiation, he was removed and exposed to the sole revivifying power of the atmospheric air and sustaining influence of the vital energies, but without avail, as they were not sufficiently powerful to restore him at all, and death was of course the consequence.

"Expt. III. *Chloroform.*—In this instance the asphyxia was produced by chloroform, using for that purpose about f℥j, by pouring it in the vessel previously used and confining the animal therein. This plan was adopted in consequence of the difficulty of controlling him sufficiently to exhibit it properly and to avoid its effects personally. The dog was soon reduced to a similar condition to that in the first experiment. Innervation was in complete abeyance, respiration entirely suspended, and although the heart's action was still perceptible, yet it was beating very feebly and frequently. The nitrous oxide water was now injected into the bowels in small quantities at a time, until less than one quart was thus introduced. In a few moments after the commencement of the injections, indications of reanimation were apparent, differing, however, from those of the first, in the absence of the strong and forcible respiratory efforts previously exhibited (and which were probably dependent on the stronger injecting apparatus before used, and the consequent larger quantity and more rapid introduction of the surcharged fluid), they being in this instance more gradually and naturally increased. They differed also in the existence of irregular or spasmodic movements, especially of the facial and masticatory muscles, with retraction of the lips, clashing of the teeth, etc. Complete recovery was, however, much more rapid, as in about eight (8) minutes the animal was capable of great voluntary effort, getting up and responding, by running, readily and actively to our calls, and in twelve or fifteen minutes was seemingly as lively and as well as before the experiment.

"Expt. IV. *Comparative—Chloroform.*—The same dog was again, on the subsequent evening, subjected to the influence of this destructive agent. The asphyxia was not, however, so completely induced as in the preceding, the desire being not to sacrifice the life of the animal, but merely to obtain comparative results. In this instance, therefore, the respiration was not suspended, but only reduced, though considerably below the normal point, until it became quite slow and imperfect. The cardiac action was also less feeble and frequent, though there was complete insensibility and deprivation of motion. On being removed and exposed to the atmospheric air, recovery gradually supervened, accompanied with similar irregular muscular movements. The time required for a return to consciousness was, however, twice as great as that in the preceding, in which the surcharged liquid had been used. The restoration of physical power was also much more protracted, and the

subsequent voluntary activity much less, with increased languor and lethargy and greater disposition to quietude and repose during the remainder of the evening. * * * * * * *

"Expt. VIII. *Hanging.*—Asphyxia was produced by strangulation from the suspension by the neck, taking care to avoid the organic lesion usually induced by the sudden forcible succussion of the neck from the falling of the body as in the ordinary process of hanging. This state of asphyxia unfortunately proceeded to a greater extent than was compatible with the existence and reinduction of animation, and death resulted. The time of suspension was about nine (9) minutes.

"Expt. IX. *Comparative—Hanging.*—The animal in this case was suspended by the neck in all eleven (11) minutes, though not continuously, the loss of the other dog causing more care to be exercised; hence when the cardiac action began to subside too rapidly, experience teaching us that it would fail very suddenly, he was relieved to ascertain the character of the respiratory effort. At the time above specified, the indications of insensibility, subsidence of the heart's action and diminished power of respiration appearing to be sufficiently strong, he was liberated, but on the removal of the rope, respiration was so immediate and perfect that I concluded not to administer the nitrous oxide water, but to make this the comparative experiment. Consciousness returned very speedily (in about two (2) minutes), but no great or general voluntary effort was successful till the lapse of nine (9) minutes, when he succeeded in getting upon his feet and had recovered sufficient power to walk about, yet very languidly. This debility and lassitude continued during the evening, as he evinced no desire for voluntary locomotive effort, but remained quietly reposing in a recumbent position. Before the experiment, however, he was remarkably vivacious and playful. Recovery was attended with the usual rapid and forcible respiratory efforts to speedily renew the due proportion of the atmospheric elements and equalize the chemical condition of the blood; also for some time subsequently with strong sonorous respiratory sounds.

"Expt. X. *Hanging.*—The same dog was again, on the succeeding evening, suspended by the neck for twenty-two (22) minutes in all, relieving him occasionally as before to determine whether sufficient vital energy remained to renew respiratory action. The temporary relief thus afforded does not, however, militate against the general result, but rather strengthens it, as this process more permanently and effectually debilitated the vis vitæ and proportionately destroyed the subsequent chances of recovery. By comparison these intervals were not more frequent than the former, and the whole time of suspension was twice as great. When the animal was finally liberated, innervation was abolished, respiration entirely suspended, and the heart's action imperceptible. In fact, these principal functions were so completely in abeyance as to simulate if not actually constitute that condition termed death. Under these unfavorable circumstances, the injection of the nitrous oxide water was commenced, and after a moment of great doubt and uncertainty, to my surprise and gratification, the heart, as if from a sudden impulse, resumed its action by a somewhat decided though labored effort, the impression of which was obvious to the eye by the succussion and tremulous motion communicated to the thoracic parietes. Immediately following the cardiac action, respiration was re-established, but somewhat peculiarly, appearing to be dependent solely upon, and limited to, the movements

of the diaphragm, as the thoracic parietes were fixed and quiescent while the abdominal region was in lively activity. The medulla oblongata and other nervous centres were, however, soon fully aroused as the respiratory efforts speedily became more general, vigorous and prolonged, similar to, though not so powerful as those exhibited in the test experiment with nitrous oxide and consequent recovery from carburetted hydrogen. Consciousness was not so immediately manifested as in the preceding comparative experiment, yet general voluntary power was much more rapidly, suddenly and perfectly acquired, as the animal was able to, and did recover the upright position, and made active locomotive efforts in five (5) minutes of time, while in the former he could not succeed in these efforts, and then but feebly, till the expiration of nine (9) minutes. Again, in a few minutes after recovery he ran to and actively vaulted into his box (an ordinary packing-box), the sides of which were higher than himself; an effort he totally failed to accomplish after repeated languid attempts on the evening previous. Another striking difference from the former was presented in the entire absence of that subsequent panting, rapid, forced and sonorous respiration, indicative of the necessity and instinctive desire for the atmospheric constituents; the respiration in this instance immediately subsiding into and resuming its natural character on the discontinuance of the injections. There was not immediately on recovery that vivacity and vigor which was so strongly exhibited in the previous experiment with, and artificial resuscitation from, the influence of chloroform, but a somewhat similar disposition to dullness as in the preceding. This was, however, of temporary duration, as in a brief period he was again quite active and lively, though not so much so as before the experiment.

"Expt. XVII. *Aconite.*—In this case f℥ss of the concentrated tincture of aconite was administered to a dog, which gradually exerted its influence on the system, especially on the stomach, vomiting being induced in nine (9) minutes, with subsequently frequent efforts at such, attended with a somewhat copious discharge of white frothy liquid like saliva. In half an hour the animal was so fully under the poisonous influence as to be insensible and incapable of any movement, lying quietly on his side. Respiration soon ceased, but the heart was still beating, though very feebly and rapidly, and he was evidently *in articulo mortis.* At this time and in this condition of things, the injections of the nitrous oxide water were commenced, and during the introduction of about one pint and a half (Oiss), respiration became established and the heart's action more decided and regular; and after the expiration of three (3) minutes consciousness was apparent, and was manifested by the wagging of the tail in response to our calls, not having yet recovered the power of moving any other part of his body. This state of improvement continued for a few minutes, when suddenly he extended his limbs and body, and sank back again into his former insensible and dangerous condition; yet, by the rapid injection of the nitrous oxide water he was again brought out of this state and restored to consciousness, and so continued for a brief period, with every prospect of ultimate recovery. But he soon relapsed, and was again revived by the injections of the surcharged liquid. Such strong prospects were presented in favor of his complete and ultimate recovery, that strict attention to his condition was temporarily withdrawn (former experience having taught us that after the re-establishment of respiration and

consciousness, perfect recovery was very speedy and certain), when he sunk so deeply and permanently that all efforts at resuscitation failed, and life was destroyed." [In all such cases nitrous oxide alone, or in conjunction with oxygen, heat, electricity, etc., should be steadily continued until the effect of the poison is entirely overcome.]

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"*Nitrous Oxide in Asphyxia.* By Geo. J. Ziegler, M. D., Accoucheur to the Philadelphia Hospital. (*January* 14, 1863.)—On my visit to the hospital I found a parturient woman, somewhat exhausted from prolonged and inadequate efforts to give birth to a child. The pains were frequent but feeble, and of a diffused, continuous, inefficient, and exhaustive character. After a change in the position of the fœtal head, which was locked on the maternal pubis, and a moderate use of brandy, morphia, and ergot, without success in procuring a natural termination of the labor, I removed the child very readily with the short forceps. It manifested no signs of life, and was apparently quite dead, the face and head being greatly cyanosed and congested with dark venous blood; the cutaneous surface cool, clammy, and livid; the body and limbs perfectly flaccid, while respiration and innervation were entirely absent, there being no effort to either breathe or make the slightest movement of any kind. The pulse was not noted in the emergency, though it is doubtful whether there was much if any cardiac action or general circulation, notwithstanding the cord pulsated for a few minutes, with too little energy, however, if blood was transmitted, to be of much benefit, as it ceased entirely some time before any signs of returning animation were manifest, and was severed soon after, in order to facilitate manipulation. The asphyxiation was, in fact, so profound, and the general condition of the child of such a character as to present every appearance of death. Acting, however, upon the supposition that molecular life might still be sufficiently active to admit of resuscitation, I immediately resorted to artificial respiration, the application of ammonia to the nostrils, affusion of cold and warm water to the cutaneous surface, mechanical stimulus to the nates and other parts of the body, etc.; but with very limited effect, for after continuous effort for about fifteen minutes, I had only succeeded in exciting an occasional and very feeble gasp, but very little, if any, perceptible change in the color or circulation of the blood, congestion of the head, or general condition of the body. Learning on inquiry that a small quantity of nitrous oxide water was at hand, I directed some to be injected into the bowels of the asphyxiated child, which was done, and with apparent advantage, for soon thereafter a marked change was manifest in the improved color and distribution of the blood, by the disappearance of the cyanosed aspect and hyperæmia of the face and head, livid hue of the skin, and the establishment of healthy hæmatosis, respiration, circulation, and innervation, with active contractility of the tissues and normal tonicity of the body generally, for the child speedily became, and has since remained, quite lively and healthy.

"In another more recent case of partial asphyxiation of a neonatus, delivered also by the forceps in the same institution, the nitrous oxide water was in like manner introduced through the bowels with apparent benefit in promoting arterialization, circulation, innervation, and general cell-action, contractility and tonicity, as the child soon after its use became quite florid and lively.

"To facilitate the artificial delivery of this child the mother was placed under the influence of chloroform, from the depressing effects of which she reacted so slowly, notwithstanding the use of ammonia, affusion, etc., that it appeared necessary to employ some more efficient stimulus. I therefore directed enemata of nitrous oxide water, but before the introduction of this liquid into the bowels, she rallied sufficiently to swallow a small quantity of it, and continued its use at short intervals until she had taken about six fluidounces with seeming benefit, as she speedily recovered from the asphyxiated condition.

"In several cases of infantile inanition, with marked cyanosed hue of mucous tissue and skin, nitrous oxide water was exhibited by the mouth with seeming advantage in arterializing the blood and prolonging the patients' lives.

"With regard to the dose of the nitrous oxide, the general rule for its employment is to use as much as is required to produce the desired effect, though in the form of the surcharged water introduced into the bowels, and of infants especially, it may sometimes be necessary, in order to secure the requisite quantity, to retain the injected fluid by pressure upon the anus.

"These cases afford additional evidence of the value of nitrous oxide in asphyxia and toxicohæmia; and sustain the facts and theories long since presented by myself, respecting the peculiar relations of this remarkable agent to the animal economy, in supplying essential chemical elements thereto, promoting organic metamorphosis, and in exerting a dynamic influence over the general processes of life. Phila., Feb. 3d."—(*Med. and Surg. Reporter*, Feb. 28th, 1863.)

[Again, in another still more recent case, in private practice, of protracted labor—foot presentation, wherein the child when removed was partially asphyxiated, with venous congestion of head and dark-purplish face, defective innervation, impeded respiration, imperfect circulation, and general relaxation, after an ineffectual use of the ordinary means, I had the father to direct a current of nitrous oxide gas from an india-rubber bag, which happened to be at hand, into the mouth and nostrils of the neonatus, with prompt effect in oxygenating the blood, clearing the complexion, resolving the congestion, and in promoting arterialization, circulation, respiration, innervation, and general life-action, with speedy resuscitation.]

Oxygen and Nitrous Oxide Mixture.—In relation to this, Dr. H. M. Lilly observes (*Medical and Surgical Reporter*): "There is a chemical advantage from this mixture as well as the physiological advantages pointed out by Professor Andrews. For if any deutoxide of nitrogen is present in the nitrous oxide as an impurity, the oxygen will promptly convert it into nitrous acid, which will speedily be absorbed by the water over which the gas is standing.

"But why mix oxygen with the nitrous oxide in proportion of one-half, one-third, one-fourth or even *one-fifth?* One-fifth oxygen is the normal proportion of the atmosphere, and since reading Professor Andrews' article I have administered the anæsthetic once mixed in this proportion. In this case everything passed off pleasantly, and there was certainly a great improvement in the matter of keeping the blood duly decarbonized during the anæsthesia. The lips and skin, instead of becoming blue, retained their normal color. But as every such

mixture dilutes and therefore weakens the nitrous oxide, why not put in *one-sixth* only of oxygen where this mixture is used? We do not need for practical purposes, during the short time that anæsthesia endures, the full allowance of oxygen that our lungs are capable of absorbing. In giving chloroform it is only necessary that a certain percentage of air should be allowed to the lungs to avoid all danger of suffocation. I have filled my receiver with a mixture of one-sixth oxygen, and propose to try it as soon as occasion requires."

Aconite Poisoning.—Dr. A. Jackson Howe records, in the *Eclectic Med. Jour.*, the following case: "About a month ago a child of Mr. Weidler, of Covington, Ky., a boy about eight years of age, was sick with typhoid fever. I had been giving him hydrochloric acid for six or eight days, when the disposition to pick at the bedclothes and to spin imaginary threads with his fingers, induced me to prescribe the tincture of aconite root to be applied to his head.* I wrote a recipe for two fluid-ounces, with directions to the druggist to mark on the vial, 'External use, with ten times as much water.' I also gave verbal directions to the mother in regard to its use, as to frequency of application, etc. When the medicine came it was time to give the internal medicine, which was so mixed with a simple syrup that a teaspoonful was the dose. Instead of giving the acid compound, the mother administered a teaspoonful of the tincture of aconite root. She became conscious of her mistake as soon as the child had swallowed the potion, and sent immediately for the first physician to be found. Dr. Hays, of Covington, was at the bedside in a few minutes, and says that the child vomited before he arrived. The boy was already in a state of collapse, as if in the last stages of cholera. The doctor administered brandy, and applied stimulants to the body. Vigorous and continued friction was kept up, as well as artificial respiration and frequent turning of the body. The bowels became involuntarily emptied of their contents, and death seemed inevitable. There was apparent suspension of the pulse and respiration for an hour or two, except a feeble manifestation of both at intervals.

"Four hours after the medicine was swallowed I arrived at the scene of commotion. The little patient was still unconscious, yet a quick, feeble pulse was to be felt, and there was an irregular catching or jerking respiration. The flesh was cold as death, and the prostration was still very great. The patient was able to swallow, and I ordered a decoction of coffee. In eight hours after the huge dose was swallowed, the patient was decidedly hopeful. The next day reaction had fully come on, and the patient was conscious and rational. I gave him no more medicine of any kind, for there seemed to be no indication for any. The delirium and fever were gone, the tongue was clean, and an appetite was pressing. The boy recovered his strength and health rapidly.

"The dose was most assuredly a fatal one, but the vomiting which occurred a few minutes after the medicine was swallowed, relieved him of a great part of the poison.

"Although such extreme measures could not be judiciously recommended to 'break up' typhoid fever, in this instance the fact seems to be demonstrated that such a thing is possible. As I was not present

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* This is singular treatment and not to be commended.—Z.

during the extreme conditions of the case, I cannot speak authoritatively in regard to the contraction or dilation of the pupil, and some other points that might add interest to such a rare case."

Chloroform Poisoning.—The same writer says (*Ibid.*), "Some years ago I was called hurriedly to see a child less than two years old, son of Mr. Alf. Burnett. A few minutes before I arrived it had swallowed nearly an ounce of chloroform. A servant had just bought the agent to put on a finger threatened with felon, and left the vial standing within reach of the child. By some unaccountable fancy the youngster drew the cork and swallowed all the contents except a few drops. The little fellow walked down a flight of stairs and half way across the room below, when he fell insensible. Upon my arrival every sign of life had gone, the body being as limpid and pallid as that of a child recently expired. I took the body in my arms, and turned it and rubbed it for an hour, endeavoring all the while to keep up artificial respiration, and such motion as would make the blood flow and the heart act. Every few seconds I thrust my finger deep in his throat, and slapped and rubbed the trunk and limbs, until repeatedly the mother besought me to let her dead boy alone. Still I persisted in my efforts, though the task seemed hopeless. At the end of one hour I was electrified with joy at the manifestation of returning life, which was exhibited in a feeble convulsive sigh. In a minute or two the child opened his eyes and said to his brother, who was standing near, 'Where's my sleigh?' The recovery to full activity was so rapid that in a few minutes more he was running about as lively as ever. No after-trouble or even inconvenience was apparent.

"During the suspended animation there must have been fluidity of the blood, a feeble or occasional motion of the heart, and enough passage of air in and out of the lungs to keep alive the 'vital spark,' though there was nothing bearing the semblance of life to be observed."

Chloroform Poisoning.—A. A. H. states, in the *Med. and Surg. Reporter*, that "a writer in the Vienna *Medical Presse*, No. 23, 1868, mentions a case which occurred ten years ago, at the clinic of Prof. Balassa, in Pesth:

"'After artificial respirations and other restoratives had been tried in vain, Balassa, as a last resort, opened the jugular vein. It was many seconds before the first drop of blood came from the wound; but at last it began to flow, and therewith came first one, then a second, and a third inspiration; finally the heart again commenced to act, and the man was saved. The witnesses of this scene long remembered Balassa's joyous exclamation, "O él—he lives!"'

"On regarding the well-known fact that so *very* many of the deaths from anæsthesia have occurred in very slight operations, explorations, and even adjustment of apparatus for deformity, where little or no blood was lost, and in graver operative procedures before much blood had escaped, it appears to me that the loss of a certain amount of blood during narcosis conduces to the safety of the patient. And this appears more probable when we look at the happy results of venesection in the foregoing case of Balassa."

Chloroform Poisoning.—Dr. J. B. Mobley thus testifies, in the same journal, to the value of position in relieving this: "I amputated at the

junction of the upper and middle third the right arm of a boy four years old, in consequence of a severe injury to the limb. It required a good deal of chloroform to produce anæsthesia. After I had ligated the vessel, it was discovered that the little fellow was rapidly sinking. Several teaspoonfuls of whisky were given, as long as he could swallow,* water thrown in his face, etc. By this time the pulse had become almost imperceptible, and the movements of the thorax had almost ceased. Just at this juncture I thought of elevating the table, and as soon as the body was brought to about an angle of forty-five the respiration and pulse almost *immediately improved.* This was even readily observed by unprofessional persons present."

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"*Death from Chloroform.*—At Wrexham a coroner's inquest has shown that death occurred from this agent, properly administered by a qualified man for an operation for fistula.

"At Leicester, Mrs. Adams, thirty-three years of age, died from the effects of chloroform given for the operation of extracting the stumps of several teeth. The evidence at the inquest showed that every precaution was used, her own attendant and another medical man being present. The jury found that deceased died from chloroform, 'in reference to which more than usual precaution had been taken.' These cases show the dangers that exist even in the hands of skilled persons. A forcible example of the folly of those who are not qualified being intrusted with such an agent is seen in the sad case of the Hon. and Rev. Arthur Sugden, who died from taking chloroform by the stomach in mistake. The deceased gentleman kept the drug by him, and was in the habit of inhaling it sometimes to relieve neuralgia, from which he suffered. On one occasion he seems to have swallowed a large dose in mistake for something more innocent. It appeared the late gentleman had also 'a *diseased* heart'—a fact that would render his *inhaling* chloroform more than usually hazardous, and be an additional reason why he ought not to have been intrusted with the drug."—(*Med. Press and Circular.*)

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"*Contraindications to the Use of Anæsthetics.*—One of these, M. Gosselin observed in a recent clinical lecture, is the inveterate use of alcoholic drinks, so common in the classes brought to the hospitals. In subjects of this kind who have passed their fiftieth year, anæsthetics should either be abstained from or employed with the greatest circumspection, so that the anæsthesia may not be too deep or too prolonged. Another still more important contraindication is the state of stupor which immediately follows violent injuries. This, indeed, is self-evident; but the question arises as to how soon after the cessation of such stupor are anæsthetics admissible. After some of these great injuries, when all the known signs of such stupor have disappeared, there may be a cer-

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* Alcoholic liquors would seem to be contraindicated in narcotic poisoning, from the fact that they retard oxidation, chemical reaction, organic transformation, and general vital activity. Whereas, on the contrary, the indications in such conditions are to promote aeration, cell action, molecular metamorphoses, arterialization, circulation, innervation, and systemic tonicity. The most useful and promising agencies for these purposes are position—adapted to the case, ammonia, capsicum, phosphoric acid, strychnia, or their analogues, and friction, artificial respiration, oxygen, nitrous oxide, heat, light, and electricity.—Z.

tain amount of latent (*larvée*) stupor which may yet deceive us. This is at present a very ill-determined matter, to which M. Gosselin is desirous of drawing the attention of surgeons. Among the injuries in which M. Gosselin thinks that the employment of anæsthetics is unadvisable are recent dislocations, and especially those of the shoulder, in consequence of the serious lesions of important trunks of nerves which may be present. The objection does not hold good with regard to old dislocations, wherein anæsthetics are particularly indicated."—(*Gaz. des Hôp.* and *Med. Times and Gaz.*)

Sulphate of Atropia in Toothache.—Dr. Samuel R. Percy says (*New York Med. Journ.*): "A young girl suffering from toothache applied to me several times. The tooth was decayed and hollow. I applied a very small ball of cotton, slightly moistened, and dipped into sulphate of atropia. It probably contained $\frac{1}{40}$ of a grain. It always gave instant relief. I think I used it a dozen times before I could persuade her to go to the dentist. It did not produce dilatation of the pupil.

"The effects of atropia remain longer in the system than any medicine of its class. If we compare it with the narcotics, we find that they are all eliminated from the system in a quicker time than atropia. If we compare it with the sedatives, we find the same result. Medicinal doses of atropia of $\frac{1}{20}$ of a grain will produce effects that will not subside in less than twenty-four hours, and frequently they last for double that time. Caution, therefore, needs to be used in administering this remedy, and doses must not be repeated too often, otherwise the system may be overwhelmed by the accumulated influence of one dose, given before the effects of previous doses have sufficiently passed over. Unless patients can be very closely watched, it is better not to repeat doses of atropia oftener than once in twenty-four hours."

Sepsin.—"In a recent annotation we alluded to the separation of a peculiar crystalline substance by MM. Bergmann and Schmiedeberg from pus, to which they applied the name of 'sepsin,' and which appeared to possess the active power of decomposing or putrefying substances. The subject has been taken up by Dr. H. Fischer, of Berlin. Its great interest and the importance of fresh light, however small, being thrown upon it, leads us to give a *résumé* of his experiments.

"Dr. Fischer remarks that if healthy pus be allowed to putrefy, after a short time, varying from five to seven days, it acquires a pungent odor from the development of volatile fatty acids, especially of butyric acid; the protoplasm of the pus-corpuscles becomes very granular, and the corpuscles form a sediment in the vessel, covered by a yellowish turbid serum of acid reaction. In the course of a fortnight the corpuscles break up, the smell changes to that of old cheese, the reaction becomes alkaline, a granular detritus is deposited, and the supernatant fluid becomes a troubled brownish juice. If small quantities of putrefying pus, as one drop, be subcutaneously injected into rabbits in the stage of its acid reaction, it is found to possess intensely poisonous properties, indicated by fever, collapse, choleraic stools, albuminuria, and death in from twelve to twenty-four hours. Post-mortem examination exhibits congestion of the alimentary mucous membrane, swelling of the mesenteric glands, inflammation of the substance of the liver, spleen, and kidneys, and bronchitis. The ecchymoses in the sub-pleural and sub-endocardial connective tissue described by Bergmann are scarcely ever found in this

mode of introducing pus into the system. Exactly similar appearances are produced by subcutaneously injecting pus during the first week or two of its alkaline fermentation. But from the seventh week onward the septic power gradually diminishes, till at the expiration of about the fourteenth week it altogether fails. The effects of the thick *pus laudabile* of connective tissue suppuration are much more energetic than those of pus derived from the thinner fluid of cold abscesses. Admixture with blood increases the septic agency of putrefying pus. Elevation to a boiling temperature materially enfeebles the septic power, and, if long maintained, altogether abolishes it. If putrid pus be diffused through a membrane into pure water, the latter acquires the septic property; but from one-half to twice the quantity is required to be subcutaneously injected in order that the same effects should be produced. The longer the process of diffusion is allowed to continue through the membrane the weaker is the action of the diffused fluid. When pus which has been allowed to putrefy for six weeks is diffused, although it possesses a septic power itself, the diffused fluid no longer possesses that power.

"M. Fischer then gives the details of a series of chemical investigations, in the course of which he obtained an albuminous substance that possessed no septic properties, and a non-nitrogenous material which crystallized in needles, and which consisted of several distinct compounds, none of which possessed septic properties. He was unable to obtain the active sepsin crystals described by Bergmann and Schmiedeberg; but he concludes, as the general result of his investigations, that there are several putrid poisons in putrefying pus, of which some are diffusible through membrane, and some are, so to speak, colloidal or non-diffusible; and, although there can be little question that the active principles are bodies possessing distinctive characteristics, yet, in consequence of their destructibility by chloride of platinum, corrosive sublimate, and absolute alcohol, no means are at present known by which they can be isolated."—(*Lancet.*)

"*Action of Putrid Material on the Animal Organism.*—The following conclusions have been derived by Dr. Moriz Hammer, of Munich, says the *Blatter f. Staats Arzeneikunde*, from his researches on the nature and action of putrid fluids. 1. Putrid infection causes severe acute inflammation in the intestinal mucous membrane and glands of the chylopoietic system. 2. It excites very violent central irritation. 3. By it the blood is changed into a dark-colored, thin, and scarcely coagulable fluid. 4. It causes the rapid approach of putrefaction. 5. The putrid poison is an albuminoid body undergoing change, not fluid or gaseous, but solid. 6. The poison acts in imperceptibly small doses, and, with regard to its intensity, can be compared only with the most active toxic agents known to us—some vegetable alkaloids, curare, the snake poison, etc. 7. It is insoluble in absolute alcohol, soluble in water. 8. It resists a heat of 100° centigrade. 9. It acts as a ferment, and induces zymotic changes in the blood. 10. The action of the putrid poison is exerted on the albuminoid materials of the plasma of the blood. 11. An analogy may generally be recognized between putrid infection and the infectious diseases. 12. The morbid materials of the infectious diseases are therefore putrid poisons, and possess the properties of the same. 13. The varying action of the morbid materials in the infectious diseases depends upon a special modification of the putrid poison."—(*Jour. of Applied Chemistry.*)

"*Improved Bleaching and Disinfecting Agent.*—The hypochlorites of lime and of soda, commonly called the 'chlorides,' are well known for their uses in bleaching and disinfecting. Orioli, however, recommends the corresponding salt of alumina. He thinks it more promptly destroys organic coloring matter and gaseous matters of a mephitic nature."—(*Ibid.*)

"*Plumbism.*—It is supposed by many that the various affections arising from lead-poisoning nearly always spring from inhaling or handling white lead—the carbonate of lead—but some of the worst and most distinctive cases which I have met with have occurred in persons who handle lead in the metallic state, or who absorb it in some other form than the carbonate. They were either plumbers, or printers, or glass-blowers. In three instances they were cooks working in a kitchen where steam escaped through leaden pipes. Perhaps the most remarkable case was that of a man who had been shot in an American brawl, and in whose cheek a portion of a leaden bullet had lodged for nearly a year, frequently causing a good deal of local irritation, and at last acute plumbism and mania. I have rarely seen ill results ensuing upon the therapeutical administration of lead, but the patients under its influence are carefully watched, and instructed to attend twice instead of once a week. The majority do certainly acquire their diseases by inhaling the carbonate of lead; but, as a rule, these cases were not of so chronic a character or so difficult to cure as those from other causes, such as constantly handling lead, in which the symptoms are generally those of arthralgia and hyperæsthesia of various parts, and sometimes of palsy of the extensors of the wrists, but seldom acute colic."—(Edward Clapton, M.D. *Med. Times and Gaz.*)

"*Ptyalism.*—Dr. Ahrouheim (*Deutsche Klinik*) presented before the Berlin Medical Society, on March 30th, 1868, two cases of chronic salivation in children; caused by the careless application of ungt. hydrarg. to their bedsteads for the destruction of vermin.

"Dr. Beer at the same time called the attention of the Society to a woman, aged 40 years, and unmarried, who had not menstruated in four months and was affected with ptyalism. An acrid saliva continually flowed from her mouth. Evident signs of pregnancy were not present, but most of the gentlemen were of opinion that the symptom was attributable to that cause."—(*Med. and Surg. Reporter.*)

"*Intermittent Ptyalism in a Lunatic.*—Dr. Paulicki furnishes an account of a woman, 38 years of age, now in the asylum at Altona, who has an attack of ptyalism on alternate days with the greatest regularity. It begins in the morning about eight, and continues to about six. During its continuance the patient sits in bed in a state of great mental depression, answering no questions, and refusing food, the saliva flowing out of her mouth. Upon an average $2\frac{1}{2}$ kilograms are collected in a day, and sometimes it almost amounts to $3\frac{1}{2}$. On her free days the patient remains out of bed, and although she answers questions correctly, she is very reserved, and takes no interest in the doings of the other patients. On these free days no ptyalism whatever has been observed, nor do two free days or two days with ptyalism ever come together. According to the account of her friends, the ptyalism has continued with the same

regularity for nearly five years—the patient having been the subject of melancholia for several years prior to its appearance. There is no elevation of temperature during the presence of the ptyalism, but an abundant sweating coincides with it. This last also prevails in a less degree on the free days. Quinine has been administered without any benefit." —(*Centralblatt* and *Med. Times and Gaz.*)

Suppression of Saliva.—A. G. B. writes to the *Medical Times and Gazette:* "I should feel obliged if you would give or procure me some advice in a case of suppressed salivary secretion. The patient, a quaint old French lady of 77, states that eight months ago she suffered about three weeks from some febrile affection apparently, and has since then been suffering from dryness and soreness of the tongue. On examination, the mouth, uvula, tonsils, and pharynx appear quite healthy, but the mucous membrane is perfectly dry, like pink satin, that on the tongue with longitudinal rugæ. Salt and sugar remain undissolved and quite tasteless on the tongue, the former causing slight uneasiness. The patient sips cold tea to relieve the feeling of dryness and the clinging together of gums, cheeks, and tongue. The teeth are all gone. There is no discoverable opening of the parotid ducts. Under the tongue are two papillæ where the sublingual ducts might be looked for, but they appear impervious. There does not seem to be any marked ill effect on health. The old lady is wonderfully well and cheery. Is there anything to be done?"

"*Hereditary Tongue-tie.*—M. Mignot, of the Hôpital de Chantelle, observes that hereditary influence may be observed in small details as well as in the general disposition of organs. It has not been remarked upon by authors in relation to the duplication of the mucous membrane termed the frænum linguæ, which, existing only in a rudimentary state in some children, is considerably developed in others. He met with a lad 14 years of age, who was a distinguished pupil at one of the lycées, and spoke without difficulty. Having occasion to examine his mouth, he found the tongue kept down to the buccal floor of the mouth in consequence of the short and thick frænum which extended to its point. Unable to pass the alveolar arch, the tongue had, by its constant pressure, pushed this forward, so that the incisors were projected externally, becoming also somewhat slanting, and separated from each other by a considerable interval. When he tried to put the tongue out it curved backward, striking against them. The lad's mother had precisely the same defect, producing with her some difficulty of speech. Out of four of her children, three were born with the same state of the frænum."—(*Gazette Hebd.* and *Med. Times and Gaz.*)

Laceration of Soft Palate.—"Dr. Martin, of Roxbury, reported to the Norfolk District Medical Society of Massachusetts a case of transverse laceration of the soft palate in a child, in which union was attempted with a wire suture; this not holding on the anterior lip of the wound, the wire was fastened to the front teeth and the parts thus kept in apposition. The wound healed completely in seventeen days. He thought the case illustrated the facility with which wounds and injuries of the mouth healed in young subjects. The boy was shown, and union was perfect."—(*Boston Med. and Surg. Journ.*)

Bone Solvents, etc.—"Le Gros Clark, Esq., surgeon to St. Thomas Hospital, has for years discarded the use of the gouge in the treatment of caries. He simply enlarges the sinuses leading to the diseased bone, and gives free exit to the discharges, and uses suitable dressings to encourage healthy action. He prefers dilute acetic acid instead of the phosphoric as a bone solvent. Mr. Holmes Coote confirms his views." —(*Richmond and Louisville Med. Jour.*)

Microscopic Preparations by a New Method.—The *Lancet* states that "a simple method has been proposed by M. Rauvier in the last number of Dr. Brown-Séquard's *Archives of Physiology,* which consists in the employment of picric or carbazotic acid. This acid is only moderately soluble in water, and a saturated solution may therefore be employed. It possesses the further advantage of being very cheap. It is admirably adapted for all tissues containing much blood, and therefore for specimens of liver, lung, etc. It appears to act by effecting coagulation of the albuminous substances, though, unlike alcohol and chromic acid, it does not occasion any fusion of the constituents of the tissue. The red globules retain their form and characters extremely well. The portion of tissue required to be examined should be plunged into the solution, and after the lapse of twenty-four hours it will be found to have acquired sufficient firmness to permit of very fine sections being made with a razor. The saving of time by this method, as compared with the chromic acid, is immense. The preparations will take color from carminate of ammonia, and may be preserved in glycerin."

"*Deodorization of Sulphide of Carbon.*—Bisulphide of carbon is by far the best extractor of grease, but there are several objections to its general use. Its vapor is very inflammable, and is also decidedly poisonous, although there may be some exaggeration in the stories told of its effects. One thing is quite certain—the smell of the commercial article is extremely unpleasant. The bad smell, however, we learn from Millon, does not belong to the pure sulphide, and may be easily removed. It is only necessary to agitate the liquid well with an equal volume of milk of lime, and then distil off at a low temperature. Litharge and copper, and zinc shavings, remove the compounds which give the bad odor equally well, and may be used in place of the lime. Simple agitation with these bodies will take away the greater part of the smell. Purified by either of these methods, the sulphide only possesses a faint odor somewhat resembling that of chloroform, and it may therefore be used to remove grease, like benzine. It must be mentioned that, left to itself, the sulphide soon again acquires a bad odor, but this, it seems, may be prevented by keeping a little litharge or some copper or zinc shavings in the bottle."—(*American Artisan.*)

Mica.—"Few uses to which mica can be placed have been found up to the present time. M. Puscher lately drew the attention of the Industrial Society of Nuremberg, to the Siberian mica, which occurs in very fine plates, and indicated some new purposes to which it could be ap-

plied. When the thin plates of mica are cleaned with concentrated sulphuric acid, and silvered in the same way as glass, they take a lustre similar to that of silver, and being pliable they can be employed in the covering of various ornaments. By heating the thin plates, and afterward exposing them for a very short time in a muffle heated to bright redness, an aspect of matted silver is given. It is necessary to avoid heating the mica too long or too powerfully, since in either case a yellow shade is communicated, as well as great brittleness. The silvery substance formed is distinguished from metals by the property of resisting nearly all reagents; it is not in the least altered by sulphuretted combinations, by the sun, water, air, concentrated acids or alkalies."—(*Chemical News.*)

"*Toughening and Refining of Gold by the Application of Chlorine Gas.* By F. B. Miller, F.C.S., Assayer in the Sydney branch of the Royal Mint.—The methods now in use for effecting the above purposes are all more or less unsatisfactory, and the author has therefore devised a process which appears to satisfy all the requirements of the case in a single operation.

"A French clay crucible is saturated with borax by immersing it in a hot saturated solution, and drying. The gold is then melted in this crucible with a little borax, and a stream of chlorine gas is allowed to pass through it by means of a clay tube (a tobacco-pipe stem was found suitable). The chlorine generator is fitted with a safety tube 7 feet long, and is connected with the clay tube by a caoutchouc tube. In a few hours the whole of the silver is converted into chloride, which floats on the gold. The borax prevents the absorption of the chloride by the crucible, and also its volatilization, except in very minute quantities. As soon as the gold has become solid, the still liquid chloride of silver is poured off, and the gold is now found to have a fineness of say 993 parts in 1000. The apparent loss of gold is very little greater than is found in ordinary gold melting—being 2·9 parts in 10,000—whereas in the ordinary process it is 2. A small sample of the gold is removed from time to time during the operation by means of a piece of tobacco-pipe used as a pipette. This is rapidly assayed approximately, and thus the progress of the operation is judged of.

"The fused chloride of silver obtained as a slab after the operation, is reduced by placing it between two plates of wrought-iron in a bath of dilute sulphuric acid. The spongy silver so obtained contains gold, which may be separated by nitric acid. The nitrate of silver can of course be precipitated as chloride, and subsequently reduced. The gold appears to be present in the chloride of silver in the form of a double chloride, and the author has succeeded in separating it directly from this combination by precipitation by metallic silver."—(*Ibid.*)

Pure Gold.—The *Sci. Amer.* says: "To separate gold from copper, dissolve in nitro-hydrochloric acid (*aqua regia*). Precipitate with a solution of protosulphate of iron; the precipitate washed and fused will be pure gold."

Water as a Lubricant.—"Water is a cheap and useful lubricant in the machine shop. Oil is costly and not always so effectual."—(*Ibid.*)

"*Lubricators.*—According to Chardon, of Paris, one of the best lubricators for metallic bodies, axles, etc., consists in a solution of ordinary soap in water. For the severest friction, tallow or butter may be added; but for common cases, potash soap alone, mixed with from one to nine parts of water, will suffice."—(*Philad. Ledger.*)

"*Adhesion of Glass Stoppers prevented.*—Much difficulty is frequently experienced in removing the glass stoppers used in bottles which contain solutions of caustic potash and soda, lime-water, extract of lead, etc. All this trouble may be prevented by dipping the stoppers in melted paraffin, upon which none of these substances act, and which also acts as a lubricant."—(*Journal of Applied Chemistry.*)

"*Solder for Aluminium.*—Dentists who make plates of aluminium will find a solder composed of seven parts aluminium to one part tin far superior to the silver solder in common use."—(*Boston Journ. Chem.*)

"*Water-Proof Paper*, which may be used with excellent effect in packing goods likely to be exposed to damp or rain, may be prepared by treating strong unglazed paper with a mixture of equal parts copal varnish and linseed oil, with a little litharge to promote drying. The paper may either be painted alternately on either side with this mixture, or better, be immersed in a shallow pan containing it and drawn out over a wire stretched across near one end."—(*Jour. Franklin Institute.*)

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This little manual presents a large amount of information in a small compass. It is divided into four parts, treating respectively of—1st, preparations and formulæ of remedies, with the conversion of fluid extracts into tinctures, wines, and infusions; 2d, gives officinal and common names, with medical properties and doses, of the different articles of the materia medica; 3d, classification of remedies according to medical properties, with list of gargles, injections, disinfectants, etc.; 4th, symptoms, antidotes, and treatment of poisoning, with the Marshall Hall method of artificial respiration in asphyxia, etc. It also contains tables of weights and measures, symbols used in prescriptions, eruption of teeth, etc., with a full index. This *multum in parvo* will prove useful to students of pharmacy and medicine as well as to apothecaries and physicians.

The Medical Bulletin. A Semi-monthly Journal of Medicine and Surgery. Edited and published by Edward Warren, M.D., Baltimore, Maryland.

This is an enterprising eight-page paper. It contains much matter of practical interest to the profession, and is an acceptable addition to our exchange list.

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, FEBRUARY, 1869. No. 2.

ORIGINAL COMMUNICATIONS.

THE CHEMISTRY OF DECAY IN DENTINE.

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It is not the object of this paper to consider the entire subject of dental decay, but only the topic indicated in the title. It is extremely interesting to study the process by which a solid plate of enamel is gradually perforated by external agencies; and it is still more fascinating to investigate the efforts of the vital force to arrest or retard the advance of decomposition in the dentine. But both these points will be left out of view, that the reader's attention may be fixed on the single question, "What are the processes by which cavities are formed in living dentine?"

Except by a few German writers, it is generally admitted that decay invariably and necessarily begins at the surface of the tooth, and progresses toward the centre. It is also generally admitted to depend on external causes—that is, causes external to the tooth as a living structure. But when the further question is asked, "What is the exact character of these causes?" the divergence of opinion begins to be important and frequent. Still, there is a vastly preponderating conviction that the efficient immediate agent in dental decay is *acid*, and of the correctness of this view the writer is entirely convinced by the following considerations:

I. The physical properties of the softened dentine taken from the bottom of a large cavity of decay are exactly those of dentine subjected to the action of very weak acids, except that the former is more discolored. Both to the unaided senses and under the microscope the identity is otherwise complete.

II. The writer has found by frequent experiment that the contents of decaying cavities, as they present themselves in the mouths of dental patients, are almost invariably of an acid reaction; and, with very

few exceptions, they are decidedly more acid than the fluid upon the surface of the adjoining gums.

III. There is no other agency than that of acid, known to chemistry, by which the removal of the earthy ingredients of dentine could be effected without destroying its minute structure. And the results of chemical analysis on the one hand and the microscope on the other demonstrate that the lime-salts are removed, and that the structural elements retain their form.

For these reasons it is adopted as established fact that the efficient agent in decay of dentine is *acid*.

In the next place, where does the acid come from? Let us consider the difficulty of satisfactorily answering this question. In examining the first permanent molar of a child, the dentist often finds, in the centre of what might seem to a less experienced eye a perfect tooth, a small hole. He enlarges this minute opening, and discovers a large cavity within, bounded by the enamel toward the grinding surface, and by a layer of decalcified dentine toward the pulp, and containing only the semi-fluid *débris* (as the microscope proves) of the dentine which has disappeared. The layer of softened dentine at the bottom of the cavity attests the action of acid, and it will be found, as already stated, that the reaction of the pultaceous mass in the cavity is decidedly acid. Now, where does the acid come from? The only communication with the cavity of the mouth is a single hole, often not larger than the shaft of a small pin; and yet the amount of acid required to dissolve out the earthy constituents from half the dentine of the crown of a tooth is very considerable.

We are usually told that the acid which effects decay in the teeth is partly taken as acid in the food, partly furnished by perverted secretions of the salivary glands and mucous membrane of the mouth, partly eructated from the stomach, and to some extent formed in the mouth by the acetous fermentation of saccharine elements in the food, retained some time in the buccal cavity.

Doubtless all these sources of acid frequently exist, and they must take part to their full extent in the destruction of the teeth. And yet, if they are compared in frequency with the actual destruction of these organs, they do not at all seem to account for the immense amount of active decay in the teeth of persons who eat little acid, who have no eructations, and whose buccal fluids are not markedly acidulated. Besides, all these causes seem to imply a greater acidity outside the cavity of decay than within it, for in the latter position the more energetic acid is being continually neutralized by the basic salts which it disengages from the dentine. And, finally, if the supply of acid comes from without the tooth, or if it is generated by the fermentation of saccharine matters forced into the cavity in mastication, there must be in some

way a constant change and renewal of the active substances, involving, of course, a removal of those which have become neutralized, that is, a circulation, more or less complete, through the orifice of the decaying cavity.

The practical dentist has only to remember how frequently he finds a very large cavity within the tooth having only a single small opening, and how rapidly such cavities are formed in some mouths, and he will be prepared to believe that such a circulation is utterly impossible in any degree that would account for the phenomena.

This course of reasoning seems to bring us to the necessity of either giving up the acid theory, or finding some source of acid different from those usually assigned.

The writer believes that the solution of the difficulty is found in the following theory: *The decay of dentine, being once begun, perpetuates itself, each step furnishing the acid by which the next step is accomplished.*

A sketch will first be given of the chemistry of the process, as conceived under this theory; and then the evidences by which it is believed to be amply sustained. A striking but familiar case will be taken as illustrative of what occurs in varying degrees in all cases of decay.

In the mouth of a feeble child about six years old, a lower first molar penetrates the gum. Its entire structure partakes of the general feebleness, and the enamel of the cusps, while it seems perfect to the eye, has failed to coalesce completely at the depression in the centre of the grinding surface. There is, consequently, a minute hole or crevice, at the bottom of which the surface of the dentine is unprotected. At the very first meal in which this new tooth takes part, an exceedingly small quantity of half-solid food is forced into this crevice, and, of course, remains. The constant heat, moisture, and oxygen within the mouth are exactly the conditions which favor fermentation of this food, and from some of its constituents an atom or two of acid is formed. The result of this acid upon the exposed dentine can be theoretically conceived, but must be inappreciable to any test. At another meal, however, another portion of food is crowded in, displacing the remains of the first, and another atom of acid is again formed. Or it may be an acid mucus that filters in, or acid taken into the mouth or vomited from the stomach. In whatever way, a slight but repeated application of acid from without is made to the surface of the dentine, and gradually, after several months, the calcareous matter is dissolved out of a little layer which remains in its place, as we find the larger layers at the bottom of advanced cavities.

As soon as an appreciable amount of softened dentine is formed at the surface of that tissue, this albuminoid dentine begins to be affected by the same agencies which have caused the food in contact with it to

ferment, and fermentation is set up *in the softened dentine itself*, resulting in the breaking down of its structure, the formation of that semi-liquid mass which fills such cavities, and the development of those acids which result from the fermentation of albuminoid substances. Of course this new acid formed within the tooth and from the constituents of the tooth, attacks the contiguous dentine and reduces it to a condition to take up in its turn the same process and furnish the means of destroying the layer beyond itself. In this way the decay progresses with accelerating velocity, since each new layer of fermenting dentine finds a broader surface for the action of its acid products.

It remains to show by what considerations and facts this theory is supported.

In the first place, it meets the actually observed conditions of decaying teeth. There is needed no circulation, but only access of air and moisture, for which a capillary orifice is ample. It is not necessary to suppose any constant and considerable acidity of food or secretions; but only so much of these as may set the destructive process in operation. And the usual conditions of average mouths exactly correspond with these diminished requirements.

Again, this theory agrees with the observed physical conditions of decaying cavities. At almost any stage beyond the very first, we find at the bottom of the cavity a layer of softening dentine, pretty firmly attached to the hard tissue beneath, softer at its surface, and covered by a diffluent mass which contains the *débris* of dentine, easily recognized under the microscope. This mass is obviously (to all the senses) the result of putrefaction; it is moreover very uniformly acid, and more acid than the general fluids of the mouth. The rapidity of decay, too, bears a constant relation to the persistency with which this acidulated mass is kept in contact with the surface of the dentine. If the cavity is nearly closed, so that little or none can escape, the disease is rapid and extensive. If the decay is upon a broad open surface, with little to retain the results of decay in contact with that surface, it makes slow progress, although much more exposed to general external agencies.

Finally, it is established by actual experiment that substances of the nature of decalcified dentine do produce in their putrefaction acids capable of removing the lime-salts from the dentine. The general fact of the formation of organic acid from animal tissues by fermentation is laid down in the books, although the writer has not met with any exhaustive treatise on their nature and the conditions of their production. But it is quite sufficient for the present purpose to adduce a carefully conducted experiment which is detailed in the excellent treatise, *De la Carie Dentaire*, of M. Magitot, pp. 119–20. It will be necessary to give some of that author's introductory remarks, that the object and character of his experiments may be understood. And this is done the

more willingly, as they present an example, unfortunately not common among American dentists, of careful and exact scientific investigation. The experiment to be cited is but one of a great number given, and the whole series was governed by the following method:

"The experiments which we are about to study having for their object to ascertain the influence exercised on the dental tissues by certain substances met with in the mouth, it was necessary, as far as possible, to imitate the ordinary conditions of that cavity. . . . . The solutions, inclosed in bottles loosely corked, were left at the ordinary temperature for a uniform period of two years, and the external characteristics, as well as the reactions, were noted at the commencement and at the end of each experiment. As regards the teeth subjected to experiment, they were human, adult, and perfectly sound, except a few chosen on purpose and presenting a commencement of decay more or less advanced. Some of the teeth were entirely free in the liquid; the others were completely surrounded with a layer of sealing-wax, perforated at a single point with a circular hole about half a line in diameter, exposing either the enamel or the ivory as the case might be, so as to localize the action of the liquid.

"*Experiment.*—Solution composed of one litre of water and the whites of two eggs shaken in the liquid. The experiment continued two years. After this time the solution was yellowish and turbid, with a manifestly acid reaction and an extremely fetid odor. The teeth, thrown freely into the glass, had undergone a general and uniform softening; the roots had become transparent and soft, the enamel friable and opaque. One of these teeth, which had presented in the centre of the crown a pretty deep groove, had become at this point the seat of a very large cavity, in which seemed to be deposited the *débris* of albuminous flakes which must have undergone putrefaction on the spot to the last degree. This cavity, with its softened bottom, its unequal and fragile borders, offered all the characteristics of true dental decay. . . . . One of the covered teeth, exposed at the free edge where the enamel had been worn off, had undergone, at this point, a very decided softening, forming a cavity in the shape of a deep groove, with every appearance of real decay."

M. Magitot adds his own conclusions as follows: "Albumen and albuminoid substances, whose action we must consider as uniform, cannot, of themselves, affect the teeth. It is therefore only by the products of their fermentation that results can be produced. Left to themselves, these matters putrefy, and form fatty acids of the acetic and the benzoic series. Those of the second series need not detain us, for they are evidently void of any possible destructive action. In the acetic series, however, are found butyric acid, the manifest influence of which we have separately studied, and valerianic acid, identical in action with the

preceding, and some other analogous derivatives. These acids are evidently produced in our experiment. The reaction of the liquid sufficiently indicates it; and the extreme fetor of the solution recalls the odor of butyric and valerianic acids."

M. Magitot goes on to apply these conclusions to the decomposition of albuminoid food in the mouth; but besides this, the experiment seems fully to justify the conclusion that the decalcified dentine, putrefying *in situ*, generates acids capable of decalcifying another portion of dentine, and thus perpetuates the destructive process.

MECHANICAL DENTISTRY.

GOODALL'S PATENT ELASTIC OR SPRING PLATE FOR PARTIAL SETS OF ARTIFICIAL DENTURES.

BY E. B. GOODALL, PORTSMOUTH, N. H.

"Th' invention all admired, and each, how he
To be the inventor miss'd, so easy it seem'd,
Once found, which yet unfound most would have thought
Impossible."—MILTON: *Paradise Lost.*

THE advance in mechanical dentistry has been seemingly slow, but to those practitioners who can take a retrospective of a couple of decades, placing side by side the results of its present *status* with the comparatively crude specimens which then existed, the advance will appear to have been very sure, if slow. This progress was brought forcibly to the notice of the writer, in his examination of eight or ten beautiful specimens of mechanical dentistry, from the artistic hand of Dr. Reynolds, to be seen in the new and elegant marble depot of Dr. S. S. White, at Philadelphia. The high finish of these specimens of whole sets shows that Dr. Reynolds is not only a ready writer (witness his article upon "Mechanical Dentistry" in the DENTAL COSMOS for December, 1868), but that he is a practical and progressive dentist.

That department of mechanical dentistry which has applied itself to the fitting of *partial* sets, has been notoriously unsatisfactory both to the practitioner and his patients; the latter ought to be, and generally are, wisely averse to the extraction of the sound teeth left, to give place to an entire set of new dentures. The practice of clasping the plate of a partial set to the natural teeth has always been annoying, insecure, and injurious; and hardly less has been the inconvenience attending the introduction of a suction plate, covering the entire roof of the mouth, and more or less impairing taste and speech.

The need of some method for partial sets which should obviate these difficulties has, in the words of an eminent dentist, "been long and severely felt by the profession."

The writer moderately claims that the elastic or spring plate invented by him, and practically tested by a large number of his patrons, to their infinite delight and satisfaction, has met that want, inasmuch as the dentures inserted by his method are entirely independent of clasps or suction, are adapted perfectly to the natural teeth, and leave the roof of the mouth uncovered; his spring plate gives more firmness, never tipping or rocking from pressure on either side, and is more comfortable to the wearer. By this method every natural sound tooth is retained—the artificial ones matching them. The writer has scores of testimonials from those who have tested in their own mouths its charming practical effects. He has recently visited Boston, New York, Philadelphia, and Baltimore, and there personally invited the examinations and criticisms of the demonstrators of mechanical dentistry of the several dental colleges in the above named cities, and he hereby tenders to those gentlemen his thanks for the cordial manner of his reception, and above all, for their open and frank acknowledgment of the novelty of his spring plate and hearty indorsement of its merits.

At the request of several of these gentlemen, he has prepared the following general instructions in regard to the mode of preparing the plate.

After obtaining an accurate impression of the mouth, either of wax or plaster, taking care not to *draw down the wax around the natural teeth* in removing the impression, proceed to make the *plaster cast, retaining all the natural teeth* upon it. With a pencil draw a curved line around the entire arch of the cast, from one-fourth to three-fourths of an inch from the necks of the natural teeth, usually terminating the plate at the proximal surfaces of the first and second molars, where incisors or canines are to be inserted; and extend the plate around the posterior surface of the dens sapientiæ on each side, where bicuspids and molars are to be inserted. Cut out from the plaster cast all the palatal portion to $\frac{1}{8}$ or $\frac{1}{16}$ of the pencil line before mentioned; thus forming and shaping the cast, so that the plate when packed will be in two strips or bands, joined firmly and neatly over the rugæ. Thus, when highly vulcanized, there will be a spring to each strip, or two elastic flexible bands which are *practically automatic*, in the full meaning of the word. Of course the form (as to width and length) is varied according to the number of teeth to be inserted, and the position and arrangement of the natural teeth.

By scraping the lingual necks of the molars or bicuspids on the plaster cast $\frac{1}{16}$ inch, taking care to scrape only above the margin of the gum, the plate will be more secure; but this is not necessary unless the arch is shallow and mucous membrane soft, spongy, or springy. Ordinarily a perfect impression and well-packed rubber base secures not only a *perfect adaptation*, but the plate is retained in place securely

without suction or clasps, simply by its *elasticity.* These spring plates do not rock or tip, even when masticating on artificial bicuspids or molars on either side or both sides, and the same is true in regard to central or lateral incisors, either single or duplicate, or all together. In his practice he has substituted with perfect success, and during the past year has inserted, a large number of partial dentures for patients who formerly wore a clasp or suction plate, and has received the warmest thanks for the neat, light, and thin artificial spring plate, in place of suction or clasp. He is aware that some dentists will be quite ready to say of this principle (everything *new* and *untried* has objectors) that it will press upon the natural teeth, producing soreness or discomfort, and is not applicable to *all* cases. The fact is (and facts are very practical) that partial dentures inserted by the method herein described, *do not occasion pain, soreness*, or discomfort to the natural teeth This being the most plausible objection, it is well to say that it is of no practical import; for suppose the plate to be heated over an alcohol lamp for ten or fifteen seconds, and the two bands to be spread $\frac{1}{16}$ of an inch or more, the result would be at first an undue pressure upon the natural teeth, but in one or two days at most, that pressure would be overcome by the expansion of the arch, so that it would be held in place by its elasticity or spring alone. If these strips were quite short and stiff, there would be a continual wedge, but the above method is essentially different and entirely automatic, as before shown.

All the spaces and divisions between the natural teeth should be neatly waxed before packing, and when completed, all the points between the natural teeth should be finished with a high polish like the rest of the plate, making a complete and beautiful piece of work.

A gentleman, a dentist of fine reputation and good practice, who has had seven partial dentures inserted by first-class dentists of Boston and Philadelphia, with only indifferent success, having recently adopted this new spring plate on rubber base, says: "I am pleased with the improved plan you have invented for partial dentures, and am confident that it will meet a want *long* and *severely* felt by the profession. After many unsuccessful attempts (extending through several years), by means of clasp and suction, to have a partial set fitted properly to my mouth, I am now wearing one after your principle with great and increasing satisfaction."

Every practical dentist who desires the advancement of the profession will gladly welcome this great *desideratum* in mechanical dentistry, for its facility of construction, economy, perfect adaptability, and general utility.

N. B.—The writer would be glad to illustrate by drawings from models, but cannot do so now.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

BY GEO. W. ELLIS, M.D., D.D.S.,
LATE PROFESSOR OF DENTAL PHYSIOLOGY AND OPERATIVE DENTISTRY IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 19.)

THAT *diarrhœa* is of very frequent occurrence in the earlier periods of existence, is a fact patent to any observer, and may be traced to a variety of causes, as improper food, injudicious use of purgatives, excess of saccharine nutriment, changes of diet, high temperature, suppression of secretions, etc.; the prevalence of hot weather is one of the powerful influences operating to produce intestinal irritation. In large cities like Philadelphia and New York, the prevalence of "cholera infantum" is greatest during July and August, beginning about the middle or end of June, gradually subsiding through September, and almost entirely disappearing in October; in cities farther south, where the hot season is of greater duration, from the longer operation of the cause the disease will necessarily be longer continued.

According to the observations of Hexamer, epidemics of infantile cholera appear when the average temperature of the month has reached 69°; it attains its height from 71° to 78°, and disappears when the temperature falls below 65°.

"In 1816, when July averaged 61°, and the three summer months but 68°, there was but one fatal case of infantile cholera in the City of New York."

Most medical authors, in speaking of the causes of infantile diarrhœa, include the irritation of teething, and to it, conjoined with hot depressing weather, we may reasonably attribute much of the mortality witnessed at least during the second and third half years of life.

With a full appreciation of the extended variety of causes which may induce exalted action in the alimentary canal, we must guard against becoming "hobbyists," by investing dentition with undue importance as an exciting cause; but, under all circumstances, deliberate carefully, and if in our judgment the trouble may be attributed to oral difficulty, ignore the derision of unbelievers and pursue the treatment found beneficial in such cases. It is the universal habit of heaping upon dentition the parentage of all infantile complaints, and indiscriminately lancing the gums when such interference is rather contraindicated than required, that has brought upon this operation the opprobrium which it is even now unjustly compelled to bear through the influence of prejudice and ignorance.

The *diarrhœa* induced by dentition presents nothing peculiar either in its progress or the characters of the discharges; the stools may be more or less thin, of a dirty white or grayish color, and curdled in

appearance, or they may be very watery, of bright yellow or greenish hue, and, in some instances, tinged with blood,—in a few words, they may assume a variety of appearances, in accordance with the character of the ingesta, the severity of the symptoms, the involvement of the biliary apparatus, and many other modifying features. "In many cases, particularly during dentition, the stools consist almost exclusively of a thick, jelly-like, semi-transparent mucus. In the more prolonged forms of diarrhœa, the discharges are, in general, very thin, small in quantity, of a dark color, and extremely offensive."

When this unnaturally relaxed condition of the bowels continues, it is attended with intense thirst, and some griping pain precedes and follows each evacuation. It is not worth while to enumerate carefully the symptoms attending the various degrees of this alimentary disorder, but simply to state that their intensity generally affords an index to the acuteness of the disease, unless from acute or chronic inflammation extensive disorganization of the intestinal mucous membrane ensues; a condition speedily followed by collapse, so alarming as scarcely to escape the notice of even an unpracticed eye.

The diarrhœa usually attendant upon dentition is, when moderate, rather salutary in its effects, but when too prolonged or excessive with exhaustion, febrile excitement, heat, and tension of the abdomen, etc., measures should be employed for its correction.

The discharges may be fæcal in their nature, and of bright yellow or green color, but, as before stated, they are generally of a thin, mucoid character, intermingled with portions of fæces or bile.

It has been stated by Billard, "that the frequency of these thin mucous discharges about the period of dentition, is in consequence of the rapid development and increased activity of the muciparous follicles of the intestines, which take place about the same time. The degree of irritation communicated to the digestive mucous membrane during the normal development of the teeth is sufficient, with the existing condition of the muciparous follicles, to cause an undue amount of fluid to be poured into the intestines, which is still further augmented if the cutting of the teeth be tedious or attended with difficulty. Although this morbid development and activity of the muciparous follicles is not an inflammatory action, it is, nevertheless, one bordering closely upon it, and hence the propriety of always keeping children affected with mucous diarrhœa, at the period of dentition, upon a strict regimen, and closely watching lest inflammation should suddenly occur."

Eruptions upon the skin are not unfrequent attendants of tooth protrusion, and although comparatively harmless in nature, their sudden suppression will often lead to profuse diarrhœa, and even inflammation of the intestinal mucous membrane.

Our first aim in the treatment of diarrhœa should be the removal of

the cause; in many instances, however, the habit of disease is so impressed as to require medication for its eradication. It is the duty of a physician to inquire into the cause of such persistence; if acidity of the stomach be present, administer a few grains of carbonate of soda in solution, a few grains of prepared chalk, or a little aqua calcis; a decoction of blackberry-root may, by mixture with the milk, prove a very excellent and agreeable astringent.

The warm bath is advised as a very excellent adjunct, and should be followed by gentle friction over the entire surface.

When the discharges are very profuse, and principally composed of a thin, nearly colorless, serous fluid, some astringent should be introduced in the formula prescribed.

Diarrhœa may culminate in inflammation of the bowels, and, although this aggravated condition is without our province, we shall not feel at a loss to combat it, when bearing in mind that inflammatory action is amenable to the same therapeutic principles here as in other parts of the economy. In cases of diarrhœa, the homœopathist claims good results from the administration of 10 pellets of chamonulla 4 times a day.

Cholera infantum is an endemic disorder, occurring throughout all large cities in the Middle, Southern, and most of the Western States, during the heated season; it attacks infants only, seldom, however, before the age of four months, or after the attainment of twenty months of age; being thus chiefly limited to the period of first dentition. So generally is this observed, that the child's second summer has come to be popularly regarded as a very critical period of its existence, and not without very good cause. Let me explain:—the alimentary tract, as we have already several times remarked, is exceedingly impressible at this period, and the transmission of nervous irritation from difficult dentition acting upon a part naturally susceptible, and still further debilitated through the influence of a heated and impure atmosphere, is all-sufficient to provoke and sustain functional or even organic disturbances that may ultimately prove destructive of its integrity.

Superadded to this, the teeth erupting during the second summer are those attended with the greatest difficulty, suffering, and danger, for if the child be born in the summer, its second summer will find the second temporary molars about peeping into notice, while if it be born during the winter, its second summer will be rendered troublesome by the progress of the canines.

Hence, however much it may be ridiculed, there exist strong grounds for the apprehension felt for the results of the second summer, and it is regarded by mothers if a child escapes at that age an attack of cholera, or passes safely through its ordeal, that its prospects of surviving other infantile diseases are good.

Cholera infantum is considered one of the most fatal diseases to

which infants are subject; in Philadelphia, during ten years, 2583 infants perished from its effects, being nearly 11 per cent. of the whole number under five years during that period, and 5·3 per cent. of the entire mortality of the city.

The disease is mostly initiated with a profuse diarrhœa, in a short time followed by extreme irritability of the stomach; these symptoms are speedily accompanied by indications of the most alarming exhaustion, and frequently death ensues in so short a time as to be almost incredible to those unfamiliar with the character of the complaint.

Various post-mortem examinations have been instituted in order to obtain an insight into the nature of the disease, but without any definite results farther than demonstrating a determination of the disease to the mucous coats of the stomach and intestines.

"The disease is evidently dependent for its production upon the action of a heated, confined, and impure atmosphere, directly upon the skin, and indirectly upon the digestive mucous surface, at an age when the latter is already strongly predisposed to morbid action, from the effects of dentition, and from the increased development and activity of the muciparous follicles, which takes place at that period."

From the fact that it prevails only in *hot weather*, increasing with the elevation of temperature, and declining with the fall of the thermometer, and is often temporarily entirely suspended by an intervening cool spell of short duration, we are forced to regard this as the essential producing cause. Furthermore, we observe that its virulence and fatality are most manifest in the impure and oppressive air of large and crowded cities; but we are frequently able to recognize dentition as a predisposing or exciting cause of the attack, although the *form* of disease is moulded by the first enumerated influences.

The first indication in the treatment is the correction of all possible exciting conditions, systemic or local; but the most essential feature seems to be the removal of the patient from without the circle of the pernicious atmospheric influences operating to develop and aggravate the disease, and with it a close observance of all hygienic measures.

If the disease commences with a simple diarrhœa, efforts should be made to check it with the remedies ordinarily exhibited for such purpose, as a combination of calomel, acetate of lead, creta prep.; if great irritability of the stomach exists, small doses of such remedies as ipecac., creasote, or camphor, will suffice to reduce the difficulty.

In the progress of the case symptoms of abdominal or cerebral inflammation are to be promptly met; frequently, however, the disease results in a chronic affection when the means advised for the treatment of chronic diarrhœa are applicable.

It may seem somewhat difficult to trace any very intimate or even remote connection between the irritation consequent upon tooth erup-

tion and difficulties manifested in the urino-sexual apparatus. Such a relationship does, however, exist. In noticing them I shall be very brief, and do little more than direct attention to the facts. No doubt they are very rare, yet we have good and abundant authority to prove their occasional occurrence.

The affections of these organs, which may be ascribed to dentition, are dysuria, or painful and difficult micturition, retention of urine, and incontinence of urine.

Difficulty and pain in voiding urine are quite frequent with infants and children; and the fluid may vary in its appearance if there be inflammation of any portion of the bladder or a deposition within its cavity.

Dentition, however, may occasion the trouble by indirectly causing some derangements of the digestive organs, and consequent acidity of the alimentary canal, leading to the increased secretion of lithic acid by the kidneys, or it may through the nervous system cause an increased irritability of the lining membrane of the bladder in common with other mucous tissues.

When dentition is at fault, the accepted means for facilitating and ameliorating its progress should be employed; the bowels should be kept regular by occasional doses of magnesia and rhubarb, and if febrile excitement be present, the warm bath is advised in conjunction with the internal administration of acetate of ammonia, with a small portion of the sweet spirits of nitre.

Retention of urine is another attendant of irregular, retarded, or difficult dentition; the indications of its presence are restlessness and fretfulness, an expression of suffering, and a persistent habit of drawing the legs up in contact with the abdomen, which, in time, becomes enormously distended from the accumulation of fluid in the bladder.

If a case in this condition is uninterfered with, rupture of the bladder will occur, sooner or later, with a fatal result.

When these signs present about the period of dentition, we may frequently regard them as cause and effect without going far astray; of course, the first indications are oral interference, and next, the use of means to relax the spasmodic contraction of the urethra. For this purpose it is advised that an active cathartic should be administered, and followed by a warm hip bath and gentle friction over the pubic region with a little camphorated oil, to which, if necessary, a small portion of extract of belladonna may be added.

Says Dr. Condie: "Whenever we are called to a young infant who is restless and fretful, and persists in keeping its legs drawn up toward its abdomen, we are scarcely free from censure, if, notwithstanding the assurances of those about it that it passes its urine regularly, we neglect to make a cautious examination of the abdomen, by which, if the retention of urine exists, the fact may be readily detected."

Incontinence of urine, independent of actual paralysis of the bladder or the muscles closing its outlet, may exist as an effect of difficult dentition; it is an affection not as serious as annoying, and one to which the attention of the dentist is rarely directed. When, however, it is known to have such origin, the removal of the cause will suffice for its arrest. If, however, it be confirmed through habit, we are obliged to resort to both medicinal and mechanical means for its correction. There are various remedies credited with efficacy in reaching this affection, but none seems to have met with such general favor as extract of belladonna, administered night and morning in small doses, being careful to avoid narcotism.

EXTRACTING TEETH DURING PREGNANCY.

BY A. P. BURRAS, JANESVILLE, WIS.

I HAVE looked over the pages of dental literature in vain to find anything worthy of note on this most important subject. A very large proportion of our patients are ladies, and it is just before or at the commencement of the catamenial discharge, and at every stage of pregnancy, that they come with the toothache most frequently. Now, what is to be done? Shall we give anæsthetics under such circumstances or not? Ask their family physician, says one. Why cannot the judgment of the dentist be relied upon? Has he not as good a right to know as the family physician? Why is it that none of the writers on dental science and literature have enlightened us on this great and important subject, but have left us to grope our way in the dark? Impressed with the importance of the subject, I propose to furnish some suggestions, as follows:

First, it is generally recognized that there is a very close relation between the teeth and uterus through sympathy. When the uterus is engorged with blood, as during the catamenial period, there is frequently a tendency to congestion of the brain. Therefore it is not advisable or safe to give anæsthetics at that time. After the discharge, when the system has been relieved of its surplus blood, I consider the most favorable for anæsthetics, and removal of the teeth.

A few weeks ago, Mrs. A., aged 40, called at my office with the most violent toothache, combined with severe uterine pains, during the seventh month of pregnancy. Just as she came into my room, her husband assisting her by the arm, a violent uterine pain came on. She was assisted to a chair, and I immediately gave her a teaspoonful of camphorated tincture of opium. As soon as the uterine pain subsided she took a seat in the operating chair, and I administered chloroform freely; it operated well, and I removed the offending member—a

large molar, badly decayed, with exposed pulp. In about twenty minutes she seemed as well as usual, and went her way rejoicing.

Second Case.—Two weeks ago, at 11 o'clock P.M., I was called, in great haste, to Mrs. C., aged 35, in the sixth month of pregnancy. She had slipped on the door-steps and strained her back. She was suffering with the most violent periodical uterine pains, with slight discharges of blood, and the most excruciating toothache in all the teeth, and could not tell which tooth was the most painful. On examination, I found all her teeth badly decayed, and, as she was very nervous and much exhausted from pain, I gave her a dose of chloroform by the stomach as speedily as possible. I found five exposed pulps; the crowns of nearly all the teeth were destroyed by decay. Removed all food and decay from over the pulps, and applied creasote directly to the exposed pulps. In less than ten minutes she was free from pain. Half an hour afterward the arsenical paste was applied to each exposed pulp, and covered with collodion, on a little cotton. Then gave her forty drops camph. tinct. opium, and ordered the dose repeated twice or thrice if uterine pains came on; but, fortunately, they did not return, and she had a good night's rest.

The next morning, at 9 o'clock, the patient was much improved, complaining only of slight headache. I removed the pulps of all the teeth, put a small piece of cotton and creasote into the pulp cavities, and plugged the teeth with tin foil. The patient has been doing well ever since.

Third Case.—Mrs. G., aged 31, came to my office, early in the morning, with pain in the first superior bicuspid, the gums and cheek badly swollen from periodontitis. Extracted the tooth, which was followed by the discharge of a small quantity of pus. The patient returned home, and the next morning was delivered of a fine boy. Mother and child have both done well.

I have given the above cases as a text. In my opinion the dentist who does not understand the intimate relation existing between the uterus and teeth, through the nervous system, is not properly qualified for the practice of dentistry. Why, then, should the dental journals ignore this most important subject? Should not dentists be as well informed on these subjects as the accoucheurs?

MECHANICAL DENTISTRY.

BY J. B. DA CAMARA, JR., NEWARK, N. J.

An article under the signature of Wm. Reynolds, M.D., Columbia, S. C., published in the December number of the Dental Cosmos, criticising the Report of the Committee on Mechanical Dentistry, made before the American Dental Association, will, no doubt, attract much attention, and be in turn severely criticised.

It affords me sincere pleasure to find the subject of mechanical dentistry likely to receive its share of attention. I have often wondered why the best talent in our profession should be so exclusively devoted to its therapeutic and prophylactic branches. I admit they are of most importance; but should we entirely neglect an art which enables us to replace a most valuable organ with so much certainty,—an art of so much importance, and already so much in advance of its congeners? It is a lamentable fact that, while all other branches of the profession have made rapid strides in advancement within the past thirty years, the *status* of mechanical dentistry remains, with the exception of a few improvements in auxiliaries, nearly the same.

Hence I rejoice to find able minds awakening to the necessity of advancement in that branch of our profession. Pardon me, if the result of my own experience and observation compels me to take exception to the theories of one so much my senior. A vast amount of information may be gathered in a difference of *twenty years*' practice; yet, as the doctor's experience in *rubber work* dates back no farther than my own, mine may be allowed.

The Committee appointed by the American Dental Association, at its last meeting, to investigate the *status* of mechanical dentistry, after remarking upon some new inventions for supplying the place of rubber for temporary sets only, reported as follows:

"No *improvement*, the advent of rubber having driven the best men from the laboratory in disgust; they recommend *only gold* for partial cases, and Dr. Jno. Allen's continuous gum-work as the ideal fully attained in supplying lost teeth and restoring the contour of the face."

It seems to me a more correct and thoroughly intelligent report on that subject could hardly have been made. That rubber should be considered a possible substitute for gold or platina, and be recommended as *superior* by intelligent practitioners to those seeking light, and trusting their professional qualifications and integrity, is certainly most incomprehensible.

That it is all the doctor claims for it as regards *facility of construction*, *repair*, and *cheapness*, I grant, but further I cannot go. In the first place, in point of durability, it is unquestionably comparatively worthless. It will rarely wear more than from three to five years intact. After being worn from one to two years, the plate becomes saturated with the fluids of the mouth, the fatty substances contained therein, and those which are constantly coming in contact with it, assisted by the heat of the mouth, decompose the rubber—not to a very great extent, to be sure, but surely sufficient to weaken it materially; it soon gives way, blocks begin to work loose, and fall off with pins intact, having dragged their *heads through* the rubber. The plate cracks down through the centre, and eventually breaks in two pieces.

Hygienically, I have met many who complain of a heating, drawing sensation, which obtains to such an extent sometimes as to produce bronchial affections. Its injurious results upon constitutions peculiarly susceptible to the effects of mercury, which is certainly liberated as the plate undergoes decomposition, and the pollution it produces in the very air we breathe by its fetid condition, convince me of its unwholesome nature, and are arguments too conclusive to be refuted.

In point of adaptability, I have no doubt but that a properly constructed metal plate will always fit as well as a rubber plate, and, in many instances, much better. I can cite numerous cases in my own experience in which I have secured a perfect fit with platina when rubber had failed repeatedly in the hands of others as well as my own. That it occupies more room in the mouth than either gold or platina, and frequently seriously impedes articulation and enunciation, is also well known. In point of artistic beauty,—alas! where is it? Can it compare with a well-made, well-carved, naturally arranged set of teeth upon platina? Can the difficulties of articulation and antagonism be overcome in rubber-work so thoroughly? Can the restoration of the expression of the face, the contour of the features, be preserved or restored so satisfactorily and artistically with rubber as with platina? Again, concerning partial cases—can it be compared to a well-made gold plate? (Suction, of course. No intelligent dentist would advise otherwise.) Say, a case of four front teeth; how much less room it occupies, and how much *stronger!* And in such cases how little likely to interfere with enunciation! And last but not least, how much more durable!

The remedy the doctor suggests to prevent clumsiness and strengthen the plate, viz , *plate teeth lined with gold* (patented), instead of rubber blocks, seems to me would *not* tend to strengthen the plate at all, and deprives the rubber plate of one of its advantages—a naturally-shaped tooth on the lingual surface.

I can see no advantage in rubber over gold or platina; on the contrary, I believe a really artistic piece of work—a perfect restoration of the lost parts—a beautiful imitation of nature—with the advantage of constant and perfect cleanliness and purity, can only be secured by continuous gum-work. I have seen platina plates that had been worn twenty years, just as fresh and intact as when first constructed. I have never seen a rubber plate that had been worn two years but that was *disgustingly offensive*, and had commenced to show signs of decay. Rubber has attained the pinnacle of its unrighteous career; its descent to a level worthy of it must soon be chronicled; and let all who aim only to attain the perfection of our art rejoice that such is the case. True, it will always sustain a certain position in the ranks of mechanical den-

tistry. It should not be discarded entirely; notwithstanding its objectionable nature, it is certainly preferable to silver, or any of the many nostrums foisted upon the profession as a substitute; besides, there are many whose circumstances will not allow a more expensive material. It rarely occurs that we find a tooth worth filling with amalgam, that *could not* be well filled with *gold.* And while we assert the superiority of gold over all other materials for filling teeth, we do not discard amalgam. There are those among the patrons of *all* dentists who are anxious to preserve their teeth as long as they may, yet they cannot think of paying twenty-five and fifty dollars for a single filling—so it is with rubber Many cannot afford one hundred and fifty or seventy-five dollars for a set of teeth. In such cases, the best we can do is to offer rubber.

But keep rubber in its place.

Do not attempt, because the public are prone to be caught by the bait of economy, to elevate rubber to the standard of gold and platina against the teaching of reason and experience. What has rubber done for our patrons and ourselves?

Our patrons have been deceived and disappointed in it; they have been cursed by the imposition upon them of charlatans and impostors,—fellows who consider it only necessary to know how to get an impression, and manage to arrange a set of block teeth upon a mass of rubber in such shape as to enable the victimized patient to tolerate it, to justify them in hanging out a sign as dentists, with an advertisement, assuring the public that they keep sets of teeth on hand ready made, with plumpers, and fitted by steam, to suit all cases, from eight to ten dollars per set. Such men (and there are thousands of them all over the country), who never hesitate to sacrifice a whole mouthful of God's work, in order that they may prove *their* superior ability, have ruined thousands of mouths. The public, unsuspecting, has been fearfully victimized; but it is awakening to the true state of affairs, and proper legislation for its protection will soon drive these unscrupulous, unqualified vampires from the field into disgraceful obscurity. Such has been its kind offices for the public.

For the profession, it has been our greatest stumbling-block; it has retarded progress; it has, by coupling our names with those of such men as I have described above, brought discredit to our profession, and a blush of shame to our cheeks. How often have we burned with indignation to find our well-meant and sincere advice spurned, and the doctor over the way quoted, and preferred, because he assures the patient that rubber is the very thing—the best thing in the world! And just think of the difference between thirty and one hundred dollars! It has lowered the standard of mechanical dentistry. How often can we find an assistant in these days, even those who have had several years'

experience, and come well recommended, who can do more than rubber-work! During the ten years I have been in practice, I have never been able to find but one man who could put up a set of teeth on platina, and he came direct from Dr. Jno. Allen's laboratory, and had never been anywhere else. I have always been compelled to do that work myself.

Truly, rubber has driven the best men in disgust from their laboratories.

In conclusion, I cannot forbear commenting upon a very unkind and unjust insinuation in the doctor's paper, concerning side issues and private combinations in connection with the report of the committee. Cannot a committee report adversely to the opinions and interests of certain parties without being charged with corruption? Shall I also be compelled to suffer the same penalty? I hope not! Be charitable, doctor, or I shall think some of the *Goodyear Dental Vulcanite Company's stock* has wandered away down South in Dixey.

THE RELATIONS OF MECHANICAL TO OPERATIVE DENTISTRY.

BY P. C. BRANCH, VINTON, IOWA.

THE introduction of the vulcanite base, greatly simplifying and cheapening the process of mounting and inserting artificial dentures, seems to make a readjustment of the relations of these two branches of dentistry necessary.

While we were restricted to the use of metallic plates, involving the various nice processes of alloying, forging, and rolling the metals into plate; moulding and casting dies, swaging plates, grinding, arranging, and articulating the teeth, soldering them to the plate, and finishing in a neat and workmanlike manner, the process was so complicated as generally to deter from undertaking it all who did not *desire* and *intend* to qualify themselves thoroughly for the skillful practice of operative dentistry also. But the introduction of vulcanite has changed all that, and now there are men all over the country who know just enough about the teeth to destroy them; who have managed to pick up, by "hook or by crook," a knowledge of the simple mechanical process now so much in vogue. The result is, that they go about the country extracting, perhaps, bushels of teeth that might and ought to be saved. Conscious of their inability to successfully fill any but the simplest cavities with anything but some cheap plastic material, even their successes (?) in this direction tend to discourage the practice of filling teeth at all.

This, added to the cheapness of their mechanical work and their peripatetic mode of operating in the rural districts, throws operative or conservative dentistry wholly in the background, so that in traversing

such localities you will find a large proportion of the people wearing artificial teeth, and a still larger one whose teeth are decaying, unwilling to make any effort for their preservation, and patiently, even cheerfully, anticipating the time when they will exchange them for those that "won't ache."

Now, I believe that a proper condition of things can only be restored by a change in the relations of these two branches of dentistry. Let us cease to regard mechanical dentistry as *professional* labor, and throw it open to competition, like any other "trade" (if you will), and then by employing mechanics at *mechanics' wages*, underbid and drive the humbugs that are everywhere to be found from the field, with the irresistible arguments of "the cheapest and the best." Thus the mechanical department will come under the supervision of the professional; thus the professional, in the exercise of good common sense, and enterprising business qualifications, can make the mechanical its willing and obedient servant, unable to exist without the oversight of its master. Under such oversight the reckless and wicked extracting of valuable teeth must cease; and a correct and healthy popular sentiment as to the possibility and the means of preserving those organs will be developed.

While I would have the fraternity cling with the utmost tenacity to professional feeling and standing, as related to conservative and surgical dentistry, I would have them withdraw that feeling wholly from the labors of the laboratory.

It is simply absurd to call that a purely mechanical process, which may be mastered by an ingenious man in from six weeks to three months' professional labor. An intelligent, discriminating public only laughs at us for doing so. The relations of the two correspond very nearly to those of physician and druggist In the city the former prescribes and the latter compounds the remedy. In the country the former does both; and yet the prescribing of remedies is not a trade, nor the compounding of drugs a profession. So the country dentist may find it necessary and profitable to perform the mechanical labor himself, without *changing* the *true* relations of the mechanical and the professional.

For more than twenty years I have adhered to the old idea, and insisted upon *professional* prices for *mechanical* labor. Meanwhile, professional, and especially mechanical, quacks have multiplied indefinitely; and notwithstanding I am able to point to teeth preserved ten, twelve, and fifteen years by my operations, these fellows are steadily undermining confidence in conservative dentistry.

Have not I, have not all of us, indiscreetly driven the people from us and lost our influence over them, for our good as well as theirs, by this course? Have we not thus given "aid and comfort" to our worst enemies and theirs?

IDENTIFICATION OF HUMAN REMAINS BY THE TEETH.

BY JOHN M. M'GRATH, M.D., PHILADELPHIA.

Among the victims of the recent disaster on the Ohio River, which cast such a gloom over our own as well as other communities, were two ladies, Mrs. T. and Miss F., residents of this city. Search was made by their relatives for the lost bodies, and, in the course of a few days, a body supposed to be that of Mrs. T. was forwarded to her relatives in this city. From particles of dress, jewelry, etc., found near the body of the deceased, at the time it was removed from the boat, the family of Miss F. was led to the supposition and belief that it was her body that had been forwarded to this city instead of that of Mrs. T. The greater part of the body was found to be almost entirely destroyed by the fire, the soft parts burnt to a crisp, the bones broken and protruding through the charred tissues, and the face badly burnt, destroying the features to such an extent as to prevent the identification of the body from that source. Accordingly, it was agreed to allow the dentists of the respective families to decide, believing that they would be able to do so from their recollection of the shape of the teeth, number and character of the fillings, teeth filled, the articulation, etc. Dr. Spencer Roberts and Dr. Robert McGrath were therefore called upon to make the necessary examination, and to decide to which family the body belonged. Dr. R. represented his patient (Mrs. T.) as having a regular normal articulation; the upper teeth closing regularly over the under. The upper incisors had been filled, and were long and narrow, the result of having been filed. The lower incisors were quite long, the gums having receded. She had lost several teeth, and the left second bicuspid of lower jaw had been filled with amalgam. On the whole, the teeth should present the usual indications of a patient near the middle age of life. Miss F., on the contrary, had an irregular articulation, consisting of an unusually projecting under jaw—a deformity which Dr. McGrath had desired to correct while she was a child, but could not obtain her consent. Her upper incisors were short, broad, and lapped a little. The left side of the cutting edge of the left incisor a little longer than the right, owing to the fact of its having been worn. The left lateral short, and narrow. The peculiarities of these two teeth were produced by the abnormal articulation. Her incisor teeth had never been filled or filed. The teeth of the lower jaw were a little irregular and short, the gums healthy, and firmly embracing the teeth. She had lost but one tooth, and had no amalgam fillings in her mouth. On the whole, the teeth should present the usual indications of youth.

On looking at the body, the first thing that attracted attention was the protruding under jaw. An examination of the articulation showed

no dislocation to exist, to account for this deformity. This alone was sufficient to dispel any doubt as to which family the body belonged. A further examination only confirmed this opinion. The upper incisors were found to be short and broad, as represented by Dr. McGrath, not long and narrow as was the case with Dr. Roberts' patient. Neither had they been filled nor filed. The left central incisor was found to be a little longer on one side than the other. The left lateral incisor was found to be short and narrow. The lower incisors were found to be short, slightly irregular; the gums healthy, and firmly embracing the teeth, instead of being long, narrow, and the gums receding, like those of Mrs. T. A still further examination showed the loss of but one tooth, that of the second bicuspid, left side of lower jaw, and not the absence of several teeth as in the case of Mrs. T. Finally, no amalgam filling was found in the mouth. On the whole, the teeth and articulation were found to correspond in every particular with those of Miss F., as described by Dr. McGrath, thus removing all doubts as to the identity of the body, and settling satisfactorily to all parties concerned, as to which family the body belonged.

THOUGHTS AND FACTS ABOUT ARSENIC.

BY J. MORGAN HOWE, NEW YORK CITY.

A GREAT diversity of opinion exists in regard to the use or disuse of this valuable but dangerous agent. My attention has been repeatedly called to this fact, especially of late, by cases which have come under my observation, and by an article in the DENTAL COSMOS for October, by Dr. Brockway. Of several cases, I will cite one, which, perhaps, may aid in illustrating what I wish to speak of, viz., the use of arsenic in inflammation.

Mrs. F—— called on me, having both first inferior molars sore and aching. They had been under treatment for several weeks by a dentist of this city, who had become discouraged, from the fact of their growing worse instead of better, and concluded that if she did not obtain speedy relief, she must have them out. She stated that every time she had returned arsenic was applied (at least the doctor said so). From one of these teeth the pulp had been removed; the other was devitalized, but the pulp cavity had not been opened. After the removal of the pulp in this latter, both of them yielded slowly to applications of creasote, and the administration of antiphlogistics. After all inflammation appeared to have subsided, they were filled with Hill's stopping, and subsequently with gold. They are both doing well and giving entire satisfaction, to the best of my knowledge. Dr. Brockway's article, although containing much information that is valuable, still ad-

vances this fallacious theory—the same which seems to have been the foundation of the practice on Mrs. F——'s teeth—that if arsenic is good once, it is always useful. He says, in the case of a root which he had already divested of its pulp, he would use the arsenical preparation to prevent inflammation. And again, "in all cases where suppuration is indicated, it is expedient to use the arsenical preparation." Now, in both of these cases, my experience teaches me that these applications would strongly tend to produce or aggravate just what the doctor thinks they prevent or cure. Surely, since the periosteum is so important to the retention of a tooth, divested of its pulp, one might be justly suspicious that a too free use of this death-dealer *might* be dangerous to this delicate membrane, to which it could be readily conducted, through the foramen, as well as the dentine and cementum. What there is in arsenic that would tend to allay inflammation, prevent suppuration or "induce greater security after the root is thoroughly cleansed," I think will be rather difficult to discover.

Arsenious acid has been used, with good results, in the devitalization of pulps, when that deplorable operation becomes necessary, and, with care, may be used successfully in cases of extreme sensibility of dentine; but that it is a panacea for all the ills that teeth are heir to, needs stronger proof than ever has or will be produced.

SOAP AS A DENTIFRICE.

BY THOS. H. CHANDLER, BOSTON, MASS.

Having seen several articles concerning "Soap as a Dentifrice," in the various dental journals, I desire to say a word on the subject.

First, as to the name. "Dentifrice" is defined in our dictionaries as "a powder, etc.," which soap certainly is not. The origin of the word is *frico*, Latin, from which comes our word "friction," implying scouring, which soap certainly does not.

My observation and personal experience for some years with soap is that it does not *clean* the teeth. Those who use it exclusively, unless in perfect health, and whose mouths would be in good condition without it, may be noticed to have their teeth covered with a deposit, slimy to the touch, and offensive to the smell, because it does not and cannot scour. In fact, it acts as a lubricant, like oil to machinery, by softening the brush, and keeping it away from the teeth, preventing "friction." In the Dental Cosmos for January, page 56, is a recommendation of soap as a lubricant for machinery, axles, and the like, to the truth of which I can testify, as well as to the same effect in the mouth. That it destroys the animalcules present in that cavity, has been asserted by too many and too good authorities for me to contest; that it

does not remove them, and that it prevents their removal, I think I know.

Aside from its neutralizing and detersive qualities, which I would not depreciate, it is an excellent ingredient in our tooth-powders, as forming a body for holding and conveying the true "dentifrice" or tooth-scourers which they contain, but by itself I would not recommend its use.

VULCANITE RUBBER WORK.

BY ALEX. BERHARD, NEW YORK CITY.

The following is a method adopted by me in the manipulation of vulcanite rubber work. The plan to which I allude is simple, but at the same time advantageous in its results.

After the work has been packed in the usual manner, place a piece of linen, previously dipped in hot water, over the packed surfaces of the rubber, then close the flask, as usual. The advantages arising from this plan are that you can safely examine the work without danger of altering the position of the teeth; and it also enables you to cut all the surplus rubber, and again thoroughly examine it before finally closing the flask for the vulcanizer.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY T. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

The meeting was held as usual in the Philadelphia Dental College, on the first Tuesday of the month (January 5th, 1869), the President in the chair.

Minutes of previous meetings since October were read and adopted.

The Recording Secretary announced to the Society that he had received a letter from the attorney in charge of the estate of the late Dr. L. D. Eveland, of Williamsport, Pa., announcing the death of this gentleman, whose name had been up to that time on the list of active members of this Society.

On motion, the Corresponding Secretary was instructed to address a letter of condolence to the family.

The Curator then reported the reception of a twin tooth, from the mouth of a young miss, donated to the cabinet of the Society by Dr. J. W. Lyon, of New York City.

Also two casts from Dr. H. K. Nütze, of Philadelphia. These represented a case of irregularity, before and after one year's treatment, which latter had apparently made a very well-shaped arch.

It would here be well to mention that very valuable specimens may

be overlooked, from the fact that there is not a sufficiently minute description accompanying them. Neither the modesty of the donor nor the want of time should be permitted to interfere with the writing of a full and careful report of the cases and means employed in treatment, thus enabling others to fully profit by the information.

The subject of "Rubber Work" having been introduced by the exhibition of some very beautifully finished specimens of vulcanite work, with metallic stays and backings, prepared by Dr. R. H. Reynolds, of Columbia, S. C., Dr. Nones opened the discussion by stating that the vulcanite base had many qualities that would make it more desirable than plate-work, *if they alone were considered;* such as the more perfect adaptability of the cases to the mouths, the greater ease and speed in the manufacture, etc. The art of manipulating with the hard rubber could be learned in a very few days by almost any one having a slight idea of mechanical work; so that it has now become an injury to the profession, by encouraging bunglers.

Opposed, were the following objections: First, and most important of all, he thought the increased facility with which artificial dentures were obtained by patients, had caused many to conclude to part with their own natural teeth, after a too hasty consideration of such a momentous question. He feared that often the proper means, to show patients the errors of their judgment, were carelessly passed, owing to the seductive knowledge that it was easier and would pay the practitioner better to insert artificial teeth than to attempt the preservation of the natural. He considered that the monopoly of the company had, in many cases, made dentists give up the article altogether, and most members of the profession he thought would soon adopt other materials. He had frequently used metallic stays, etc., to strengthen the rubber work, and saw no new feature in the cases before him.

Dr. W. H. Trueman thought rubber to be very rarely as useful as gold or silver, although in some few cases it seemed to answer very well. Reviewing its history in connection with dentistry, he thought it had proved a failure, and had no doubt but that in a short time, under the fostering care of the Goodyear Dental Vulcanite Company, it would be banished from the practice of nearly every respectable dentist.

It is claimed that with rubber a more perfect adaptation to the mouth can be obtained. An experience of over eleven years in a dental laboratory had convinced him that, with proper care, a plate perfect enough for all practical purposes can be made of gold or silver. It is true that they require more care. It takes some time to learn how to work the metals, and a little more of brains to begin with; but when complete, a far more useful and durable base is obtained.

In regard to cleanliness, he thought too much had been claimed for vulcanite. In breaking up old cases (a pastime he had indulged in

lately), quite a large space is often, indeed almost invariably, found between the plate and teeth, into which particles of food and the fluids of the mouth find their way; these, in decomposing, give out an odor which, to say the least of it, is not very pleasant. Sometimes he had found bristles, from the brush used in cleaning the case, worked in under the teeth.

This defect is not due entirely to carelessness—it will occur in the hands of the most careful. In vulcanizing, the rubber appears to contract much more in some specimens than others, but more or less in all, and the harder it is made the more it contracts. It may be caused by the comparatively large amount of sulphuretted hydrogen formed in the rubber and given off or absorbed by the plaster of the mould during the process. Although these spaces exist of necessity in plate-work, they are more readily cleaned.

The rubber being in a measure porous, and an organic substance, retains impurities with far greater tenacity than either gold or silver. If a patient makes use of the proper means, either plate or vulcanite work can be kept clean; if they do not, either will become offensive.

Another objection, and a very serious one, is its want of strength. Unless made so thick as to be clumsy and awkward in the mouth, there is a constant liability to accident; true, they may be strengthened by the use of gold or platina, used as in these specimens (which, by the way, are by no means new or original, similar contrivances having been used by himself and others, with but slight and immaterial modifications, long ago). Even then the difficulty is not entirely overcome. These plates will crack sometimes, in spite of everything, and so will gold or silver; but with the latter, the accident can be repaired in a short time and the case made as strong or stronger than before: while the rubber becomes weaker and more liable to accident every time it is revulcanized, until, after passing through the process three or four times, it becomes entirely worthless.

Artificial dentures are always liable to mishaps, even in the hands, or rather mouths, of our most careful patients. Accidents to the teeth themselves often occur, perhaps more frequently out of the mouth than in it. Some patients are very careless, and persist in bringing their teeth in forcible contact with such things as wash-basins, marble-top wash-stands, brick pavements and the like. They ought not to do it—but they do. We cannot control their actions—we must meet these exigencies as we find them. For this reason it becomes very important to mount teeth on a material and in a manner admitting of easy, and, if need be, frequent repair.

In one respect he regretted the introduction and use of hard-rubber by the profession; as the skill required by the workman in this is inferior, it had inaugurated slovenly and careless habits; it had enabled

men to enter the profession, without making the least effort to properly qualify themselves for it. A blacksmith, with perhaps a week's instruction in a laboratory, would step from the anvil and the forge into a dental office—only a blacksmith still! Did these men's failures affect them alone, we should have nothing to say.

Within the past three months he had replaced at least half a dozen vulcanite cases with gold or silver. One gentleman, who has been for many years a practitioner of medicine in this city, for whom a gold set was made in place of one of vulcanite, asserted that he would not have worn the rubber in his mouth for $500, if he had thought, when it was inserted, that his general health would have suffered as it had done since. He now believes that it was entirely due to the vulcanite upon which the teeth were mounted. He had worn them a little over three months and soon recovered his usual health after discontinuing their use.

Dr. T. believed that rubber had had its day; the exorbitant, unreasonable, and humiliating terms of the Dental Vulcanite Company are fast driving it into the hands of men without either talent or ability. In their careless hands it will not take long to destroy the reputation that really skillful workmen have made for rubber.

Since the company had made the last arrangements, he had given up the use of rubber altogether; he found no difficulty at all in getting along without it, and did not think he could be induced to resume its use until the professional pride he felt was broken, or the arrangements were such as not to wound his pride when he used the base.

The President said, in the discussion of this interesting question, some of the objections urged against the use of hard rubber are well founded, while others are open to decided exceptions. The facility with which this material can be used, by inexperienced and unskillful workmen, in the construction of defective dentures has lowered, to a certain extent, the standard of mechanical dentistry, and been the means through which men, entirely ignorant of the principles of mechanics and the science of dentistry, have been added to the ranks of our profession by hundreds, after a limited apprenticeship of a few weeks or months. Again, thousands upon thousands of teeth which might have been preserved have been sacrificed, owing to the limited expense of such dentures in comparison with the cost of saving the natural organs. These results are to be deplored, but sooner or later the demands of the profession as a body, and the growing intelligence of the community, would correct such abuses. Again, it is more than probable, owing to the importunities of patients and in opposition to their own convictions, that this material has been too extensively used, even by skillful and experienced workmen. But that it fills a niche when properly used quite equal to any

other material, must be admitted by all, as for instance in cases where there has been very great absorption of the alveoli, where the insertion of a denture upon a metallic plate, gold, silver, or platina, whose weight, added to that of the porcelain blocks, would necessarily make a very heavy operation, would be exceedingly tiresome to the wearer. The beautiful work which has been shown here this evening is an evidence of the fact that skill is required to produce a finished effort in this, as in the construction of a denture on a metallic basis, and that, while unskillful persons may be justly charged with constructing work which is a disgrace to the profession and a disadvantage to patients, yet there is the same opportunity for a display of a high order of skill and ingenuity in manipulating with this material as in any other. The abuses of an article should not be charged against it, but rather to those who perpetrate such acts. This is true of hard rubber. While compelled by a sense of justice to make these statements, he did not wish to be understood as advocating its use where it is possible to avoid it, particularly when viewing it in its relations to the exactions of the Hard Rubber Company. Regarding gold and silver as materials which have stood the tests of time—looking upon Dr John Allen's continuous gum-work as one of the most valuable inventions of the past twenty years in our profession—those engaged in mechanical dentistry will find ample opportunity for the construction of satisfactory operations, and be able to dispense, to a great extent, if not entirely, with the use of hard rubber.

Dr. Long considered that hard rubber had been of very slight if any advantage to dentists; it very rarely seemed to be necessary to use it, as it is seldom equal to gold or silver for a base.

He felt bound to enter his protest on every occasion against the extortion of the rubber company, and did all he could, under existing circumstances, to avoid encouraging the use of this patented article.

Dr. Howard favored this material for its ease of manipulation, surety of fit, and lightness, where the latter quality is desired or demanded. In durability he did not consider it on a par with gold or silver, and justice to our patients can be rendered with these metals in pretty much all cases. Being fully settled upon these points, and greatly influenced by the demands of Nelson Goodyear, he invariably urges his preference for either of the above metals over vulcanite.

Dr. Eisenbrey thought very few dentists would admit that they are strongly in favor of rubber for artificial dentures; he firmly believed that teeth mounted on metals, in a great many instances, giving the least satisfaction to the wearer, can on rubber be made to give the greatest, and without detriment to the patient's health. In reference to the trouble said to arise from the mercury contained in the coloring matter, he was not prepared to indorse the statement, from the fact of

no mercury being found, unless the plate was destroyed by burning, which never takes place in a patient's mouth. Until it is demonstrated beyond a doubt that mercury exists in a free state on the surface of a highly polished plate, he would feel safe in holding that the detriment to the patient wearing a vulcanized plate, was not from the mercury it contains, but owing to the decided want of conducting property of the substance, it being placed among the lowest on the list of non-conducting bodies. A closely-fitting plate, together with the drawing of an air chamber, causes an excess of blood to flow to the parts; consequently an increase of heat is generated, which, not being diffused over all parts of the mouth, the local increase of temperature is retained. The action is much more decided in persons of a very nervous or impressible temperament. If the soreness be due to the action of the mercury, why are not the inferior maxillæ, the pharynx, and the remaining portions of the superior maxillæ affected, as well as the parts in immediate contact with the plate? Before mercurialization takes place, must it not enter into general circulation, and be carried throughout the whole system? When this occurs, look for carelessly inserted amalgam fillings, and see if they are not the cause of the trouble. The lymphatics can take up the oxide of mercury from amalgam plugs far more easily than from vulcanized plates. If there are no amalgam fillings in the mouth, the trouble is occasioned by the non-conductibility of the plate, causing it to be a constant irritant, rather than from any injurious action of the sulphuret of mercury contained in the coloring matter.

On the other hand, it may be said that quite as closely-fitting plates of metal, with an equal amount of suction, do not occasion the same tronble in the same patient; if it is not from the mercury in the former, an explanation of the trouble is asked for. Gold and silver being among the very best conductors of thermal changes that we have, as fast as there is an excess of heat in the plate, it is conducted over the whole surface of the mouth, thereby keeping it in a state of equilibrium of temperature throughout; hence there is no uneasy feeling in the hard or soft palate from this cause. He ventured to say, that if a gold plate was *completely* incased in rubber, except the palatine surface, it would occasion the same trouble, making due allowance for the difference of adaptation between a swaged plate and one that shows the trace of the faintest mark. He would like it tried in the mouth of a patient who could not wear a complete rubber set, so as to hear of the result. The metal plate, he believed, carries off the heat, allows the capillaries to maintain their tonicity, and forces the blood on, keeping up in them a normal instead of an abnormal circulation, giving ease and comfort to the patient.

He knew that vulcanized plates were sources of great discomfort to some patients, where metal plates can be worn with ease; but, for all

that, he firmly believed that it was due to the causes which he had stated and endeavored to prove.

So far from rubber lowering the standard of the profession, he thought it would be one of the means to bring about that result, which is so much needed at the present time, which, even now, this assembled body is striving for—that of elevating and raising it to the highest pinnacle of perfection, so far as is possible with man.

Eventually (not suddenly, or it would not stand) it will make that grand distinction between those who are dentists in every true sense of the word and those who are dentists only so far as the names on their signs imply. The community at large begins to recognize the distinction that exists between those who are educated in the art and science of dentistry and those who are not

The poor must live as well as the rich, and he was sure that there were very few who would throw open their doors, out of the goodness of their hearts, and operate for those that could hardly pay living prices for the work performed, when they have constant employment at remunerative prices. Rubber supplies that want, for it is demanded by the poor, and there are persons raising up to mould it for that purpose; here will be the distinction spoken of.

For correcting irregularities and deformities, its use cannot be *valued.* The Lord, out of the goodness of his heart, created nothing but what would meet the requirements of his subjects, as the cycles of time passed around. There is something, yet in the future, to supersede rubber. Let us work for the future but accept the present. As new demands are made, and the proper time arrives, they will be supplied; till then we are free to accept or reject what we have at command.

The persons that cannot wear vulcanized plates with comfort are so few in number compared to those that can, that it is hardly worth bringing up as an objection.

How many are to-day suffering, yes, actually suffering, from wearing silver plates in their mouths, and the oxide of that metal continually passing into their stomachs, to say nothing of the injurious effects produced by the destructive decomposition of the food between the teeth and plate! The restrictions of the Hard Rubber Company are admitted to be great, but "what cannot be cured must be endured." Where *all*, even the judges of our courts, are against us, there is nothing to do but submit. If a discovery of anything that is of very great use to mankind is made, is not the discoverer the proper one to receive the benefits? others that use the article should pay for the ingenuity, study, and labor expended in developing it. He did not wish to be understood as advocating the cause of the Hard Rubber Company, by any means, for he could assure all, that he was quite as much opposed to it as any, though not quite so demonstrative, but believed in taking a broad and

liberal view of both sides of the question, with a mind unbiased by any prejudices.

Dr. Breen had worked in gold, silver and platina, had thought he could not change for rubber; but had been induced to try it. He now likes it better, and believes its use gives more satisfaction to the patient than gold, or the other metals. It has the advantage of being lighter, which reduces the liability to break from falling; he having known a case to be thrown across the bed-chamber on three or four separate occasions by the patient in his sleep; the teeth were not fractured. After an impression the rugæ are not broken down by swaging, consequently a better fit is procured. He found it strong and in some mouths more durable than metal, but cannot approve of the course taken by the company that holds this patent.

Dr. Stellwagen desired to be clearly understood, that although in nearly every case he thought that the old-fashioned metal plate was superior to the vulcanite, he still recognized that cases might arise where the latter would be preferable under certain coexisting circumstances, then he would recommend the patient to find some one who had the right and the ability to make such a piece of work as might be required. He did not now use it himself, and thought that the number of instances in which its lauded superiority was urged, were more apt to be due to the readiness with which laziness excuses itself for an imperfect operation, than the result of a truly unbiased comparison of the advantages and disadvantages arising from its use.

Human nature leads most men into the broad easy ways of life, and after once getting into such paths, to retrace the steps was found generally a painful and disheartening task. For one, he had used the patent rubber in a number of cases, and he thought that he might have been content to continue, had not the final adjustment of the suits of the company *vs.* the dentists made him again consider the whole matter most carefully. He thanked the judges who had decided against the dentists and hoped the company owning the patent-right would put on the tariff and increase the objections, until every dentist in the land should reconsider his work before proceeding farther. Aside from an opposition to the patenting of articles calculated to be of service in relieving human suffering, he felt there were other and most potent reasons for the almost complete abandonment of its use; among which he would mention:

Economy and Health—so far as the patient is considered. It is well known that the more we reduce the price of any article of consumption, the greater is the number of those brought pecuniarily within the range of enjoying the apparent benefits arising from its use. Are we justified in thus increasing the inducements offered to discard the natural teeth, and receive in return miserable substitutes that, let them

be ever so perfect, are, after all, only the products of human skill, which are thus received in place of the natural organs furnished by God himself, for the preparation of food destined to serve the purposes of his most perfect creatures?

It is a vegetable product, and liable to decay.

More readily will it undergo this process in the mouth, where the acids, warmth, food and secretions, with which it comes in contact, all hasten this change; and thus in this important cavity we have, at the very portals of life, an enemy none the less deadly, because, like the asp of Cleopatra, it is concealed amid porcelain pearls instead of fruit. The pores of the material, after a time, are filled with these matters so obnoxious to life; while the color, which is due to the bi-sulphuret of mercury or cinnabar, may occasion the patient to undergo the risk of ptyalism, some microscopists having asserted that they have discovered free mercury upon the surface.

At all events, the testimony of many, some of whom are celebrated for their learning in the medical and other liberal professions, assures us that sometimes a diseased condition supervenes upon the wearing of vulcanite, from some cause or other, which we need not stop to discuss, since it is admitted by even the advocates for the use of rubber. This fact certainly will, to the conscientious, forbid its employment, excepting in the very rarest cases, where it seems to be the only thing that can be used.

Durability. The decomposition spoken of above, one would think, is quite sufficient to prove to the mind of disinterested observers that the economy is on the side of the metal plate in at least a ratio of 5 to 2; or, a well constructed set on silver for thirty dollars will, at a moderate estimate, outwear two and a half sets on vulcanite at twenty dollars each.

But the objection is raised that the mouth may undergo great change, before the silver or gold set is half worn out. This is probably more of a theoretical than a practical view, with regard to properly fitted permanent sets; the argument being based upon the exceptional cases more than any rule deduced from a carefully studied majority.

Only a few months back, he was called upon to examine a silver plate that he had inserted, as a temporary case, in the patient's mouth in 1860, a few weeks after having extracted a large number of hopelessly diseased teeth and roots. The plate had been worn constantly ever since and given so much satisfaction that the patient was loth to part with it; but an alteration in the condition of the lower teeth had made it advisable to recommend that the *temporary set, which had done duty for eight years,* should be replaced by a permanent case. How many vulcanite sets would have stood the trituration, the strains, the acids,—in a word, the general wear and tear—that this case had, situated as it was in the mouth of a powerfully muscular man?

With regard to the cases upon the table, he thought the workmanship was very fine, but with reference to the novelty of the idea of gold or platina backing and stays, he had used them frequently to strengthen vulcanite work and never before saw any one lay claim to have originated it.

Dr. C. N. Peirce said his experience in mechanical dentistry had led him to adopt the gold or metal stays in vulcanite work and the specimens before him seemed to present nothing new; but he had now entirely abandoned the use of rubber, as he was convinced that well-made silver sets, heavily galvanized with gold, were far healthier and better in every way than hard rubber, in all but rare cases.

Dr. Harris observed, with reference to the objection to patents, that the vacuum chamber made in most of the metal plates was a patent, and yet the right to use it was not enforced. From this he drew the conclusion, that the mere fact of an article being patented should not ex clude it from the dentist's office or laboratory.

Dr. Trueman then exhibited, under the microscope, a section of enamel, cut from a perfectly sound adult molar, which, before the section was made, had been soaked for some days in a solution of the tincture of iron and, after drying, was immersed in a solution of the ferrocyanide of potassium, by which means Prussian blue was formed, coloring the enamel on the surface, showing, under the microscope, this color penetrating a short distance between the enamel prisms and along apparent openings in the enamel, extending about half way across. He thought, judging from some experiments, that under pressure this color might be made to penetrate much deeper.

Dr. Stellwagen called attention to the lead-water and laudanum mixture suggested by Prof. McQuillen, a few meetings since, as a local antiphlogistic application for periosteal inflammation of the teeth.

He mixed the two liquids before the meeting, and showed the precipitate of the meconate of lead and gum resins found, which not only makes an unsightly mixture, but seems to be an evidence that it is not truly a scientific preparation. The same therapeutic results he thought should follow from the use of a solution of the acetates of morphia and lead, which could be made stronger and without any precipitates. This he demonstrated by making and mixing the solutions before the gentlemen present.

The invaluable results derived from the use of the compound as suggested by Prof. McQuillen, had been so frequently proven in his practice, that he had been led to think of trying this solution, which he thought was virtually the same as in the mixture; the lead-water there forms the solution of the acetate of lead with the acetate of morphia obtained from the tincture of opium, having the inert meconates precipitated, which only weakens the strength.

The solutions employed were:

℞.—Morphia acet. grs. x;
Liq. plumbi subacet. f℥iv.
Aqua, f℥ij.
Fi sol.

Samples were handed to those desirous of trying its efficacy, with a request that the results should be reported.

Of course the strength of both could be increased if found desirable and a few drops of acetic acid could be used to make a clear solution if any free morphia or lead should be found. He advised the cautioning of patients in its use on the eye where the cornea was ruptured, as an opacity might be formed by the cicatrix ensuing upon the healing of the tissue having the lead in it.

Several members spoke, but the lateness of the hour (it being nearly half-past eleven) made their considerations very brief.

It was then proposed and carried, that the subject for the next evening's discussion be "The Extraction of Teeth;" especially having regard to the indiscriminate practice pursued by many when using anæsthetics.

Dr. Nones moved that for the present the Society should adjourn over until the first Wednesday evening of each month; the meeting of the Academy of Natural Sciences being held on Tuesday evening, it caused many who attended here to miss being present at the proceedings of the Academy.

The motion was then put and carried.

Adjourned to meet Wednesday, February 3d, 1869, at 8 P.M.

CUMBERLAND VALLEY DENTAL SOCIETY.

BY GEO. W. NEIDICH, D.D.S., CARLISLE, PA.

A REGULAR meeting of the Cumberland Valley Dental Society was held at Chambersburg, on Tuesday evening, January 12th, 1869.

The President, Dr. J. L. Suesserott, in the chair. Members present: Drs. Platt, Haycock, Forrest, Hatton, French, Bender, Neidich, and Miller.

The minutes of the previous meeting were read and adopted. The Executive Committee reported favorably on the applications of the following persons for membership, viz.: Drs. Wm. Wright, of Chambersburg; Geo. A. Uhler, of York Springs; M. A. Berry, of Hagerstown; H. N. Eberly, of Mercersburg; W. Zinn, of Shiremantown; and Jacob Slyder, of Mechanicsburg. All of whom were unanimously elected members.

The President made a brief report for the delegates to the State Society, which was discussed at some length by the members; the bill

adopted for presentation to our next legislature was severely criticised, and regarded by all the members present as unjust, from the fact that many of our best practitioners are not graduates of any dental college; and the requiring an examination of them, while younger and less experienced men—who, by false certificates, lenient examinations, and a disposition shown by some faculties to grant a diploma to every applicant, and even without attending lectures, merely to swell their lists of graduates—were exempt, was strongly denounced by every member present.

On motion, a committee was appointed to prepare a fee bill and code of ethics for this Society, to be presented at our next meeting; committee consisting of Drs. Forrest, Neidich, and Bender.

On motion, Dr. Neidich was appointed essayist for our next meeting; and the following subjects were chosen for discussion, viz.: "Recedence of Gums and Absorption of Alveoli;" "Use of the File in Superficial Caries;" and "Preservation of the Deciduous Teeth."

On motion, adjourned to meet in Hagerstown, Md., on the evening of the last Thursday of May next.

IOWA STATE DENTAL SOCIETY.

The Iowa State Dental Society held its annual meeting in Keokuk.

The following were elected officers of the society for the present year: Dr. Ingersoll, of Keokuk, President; Dr. P. S. Smith, of Tipton, Vice-President; Dr. W. O. Kulp, of Muscatine, Recording Secretary; Dr. N. H. Tulloss, of Iowa City, Corresponding Secretary.

Essays were read by the following gentlemen, and thoroughly discussed: Dr. H. S. Chase, "Best Mode of Preserving in Health the Dental Pulp after Exposure;" Dr. J. Hardman, "Some Reasons for the Early Extraction of the First or Six-year Molar;" Dr. W. O. Kulp, "Saliva;" Dr. P. S. Smith, "The Dental Tissues;" Dr. L. M. Jackson, "Filling Teeth;" Dr. J. P. Wilson, "Dental Quackery."

Adjourned to meet at Muscatine, in July, 1869.

N. H. Tulloss, *Corresponding Secretary.*

OBITUARY.

Dr. Seth P. Miller, of Worcester, Mass., died Dec. 18th, 1868, aged 59 years.

Dr. Miller had been a faithful representative of the dental profession for a third of a century past. He was one of the most successful dentists of the old school of practice, yet he kept fully up with all the improvements of the day. He had been in full practice till within about

a year and a half, when his health became so poor that he was compelled to seek rest and recuperation.

He visited Florida for a few months, but his disease of the lungs made such progress that he came home a few weeks since to spend the few days of trial and suffering which should be his lot till death should relieve him.

He leaves a wife and married daughter, having lost a promising and only son about two years since, who died while studying at Dartmouth College.

Dr. Miller was born in Grantham, New Hampshire, and studied medicine at Hanover; then abandoned that plan for the specialty of dentistry, and settled in Worcester in 1835, as a competitor of the late Dr. Blood, at that time the only dentist in Worcester County.

Dr. Miller was a man who could use the pen as well as the excavator or plugger, and it is a great pity that our literature has not had more contributions from him. The principal published letters of his are those on Risodontrypy, in the *Recorder and News Letter* of 1852–3, in which he claims, with the late Dr. Hullihen, the honor of first operating by that, then new, method, now quite gone into disuse.

Prof. C. A. Harris, in conversation with the writer upon Dr. Miller and his letters, complimented him as a very capable writer, and as understanding his profession exceedingly well. Dr. Miller's professional characteristics were seen in his love for his chosen vocation; he persistently strove to do his best, which gave his patients the benefit of such results as may be seen among them here for a long time to come.

The teeth are enumerated by thousands which are the standing monuments to his faithfulness and skill. He was elected President of the Central Massachusetts Dental Association at its organization, and held that position at the time of his death. H. F. B.

BIBLIOGRAPHICAL.

MISSOURI DENTAL JOURNAL. Editor, HOMER JUDD, M.D., D.D.S. Assistant Editors, H. S. CHASE, M.D., D.D.S., and W. EAMES, D.D.S. St. Louis, Jan., 1689.

This is the first number of a monthly magazine recently started in the West, under the editorship of the above-named gentlemen, each of whom has charge of a separate department: the first embracing articles of a scientific and literary character; the second those relating principally to operative dentistry; the third, mechanical dentistry and miscellaneous articles. Acting on the division of labor thus indicated, a number of interesting, original, and selected articles are presented in a space occupying forty pages of reading matter, the number which it is

proposed each issue shall contain. In entering upon their responsible duties, we wish the editors and their movement every success that should attend the management of a well-conducted magazine.

J. H. McQ.

Atlas of the Pathology of the Teeth. Arranged and Explained by the late Professor M. Herder and Professor C. Wedl. The Drawings taken from Nature, by Dr. C. Heitzman. Part I. Arthur Felix. Leipzig, 1868.

A copy of the above atlas, to be published in four parts, has been received from the publisher. It is printed in German and English, one-half of each page being occupied by the German text with the English translation presented on the other half. It embraces a description, general and microscopical, of a series of forty-three pathological specimens, all of which are accurately numbered in the text and in the accompanying illustrations; the latter of which, as works of art, are well executed. As there is no preface accompanying the work, it is impossible to say whether the authors have confined themselves exclusively, in the subsequent numbers, to a mere description of cases, or in the concluding part draw certain general deductions from them. The absence of such preface would indicate an intention to confine the work to a simple description of cases; even in this event, if the subsequent numbers should be as well illustrated as the first, the work will prove a desirable contribution to dental literature. J. H. McQ.

CORRESPONDENCE.

ROSE-PEARL AND THE WESTERN NEW YORK DENTAL ASSOCIATION.

To the Editor of the Dental Cosmos:

In defense of truth and science, I claim a little space in your journal. The December number of the Dental Cosmos contains a report of a committee of the Western New York Dental Association, on the "subject of the fitness of Rose-Pearl as a base for artificial dentures;" which report not only falsifies truth and honesty, but reflects upon my veracity.

I shall briefly state a few facts pertaining to said committee's report, and at the same time endeavor to impart some information to the profession in reference to rose-pearl, believing it will not be without interest to your readers at this time.

In August last I stopped a week or ten days in the City of Buffalo, and taught a class the *initiatory* lessons in manipulating rose-pearl. I

say initiatory lessons, for that is all that could be attained in the short space of one week, as we then worked rose-pearl. (At that time I was experimenting on an improvement which I have since perfected, very much simplifying the new system.)

I made *no misstatement* to the dentists in Buffalo, nor to any other parties; on the contrary, I tried to impress forcibly upon their minds, as I have always done elsewhere in teaching my new system, that at least one month's practice in working rose-pearl would be required to *familiarize* them with the new material. This is the experience of those using it, many of whom are dentists of skillful attainments in other things.

Almost every step in the process of producing an artificial denture on rose-pearl differs from what is required in working any other base, and my sole object was to teach the *modus operandi*, and not to hold myself responsible for *perfection* of the pieces *the class should make while learning a new system* and *the properties of a new substance.* One difficulty with parties learning this base is (or was, by the process as then taught), that they pay too little attention to the treatment *subsequent* to making their moulds and pressing their piece. Up to this point they have learned *almost nothing* of the properties and nature of the new base, and yet they generally think they have "the whole thing," and when they find out their disappointment, they are prepared not only to curse rose-pearl, but its originator. With the same propriety and sense, might a committee of tyros in filling teeth condemn gold for chopping up under their instruments, and say "they regretted to say, that the pledges of the foil-maker had not been redeemed," because the thing would not stick.

Of the six names to the report in question, only *five* of them received instruction; the sixth one was not a member of the class, and made no pretension to learn.

The committee accredit me with making the rose-pearl plates submitted to their examination, when in reality it was *their own* handiwork. I made and fitted in the mouth *but one case* of teeth in Buffalo; that was for a patient of Dr. L. F. Harvey (the signer of the minority report). This is doubtless the piece the committee say "may still be in the mouth of a patient."

Both of the plates so minutely described in the report were for Dr. Hayes. He required very long teeth, and we had to use on the first case teeth entirely too short. I arranged them in his mouth by gaslight, and set them too high. A thick body of base was necessary to fill the space under the teeth, and may have had something to do with changing the articulation. The piece was removed from the model when about half evaporated, to try in the mouth; the teeth proved too short, and no further attention was paid to preserving the shape of the

plate or to complete its evaporation. As a matter of course it warped, and so will a green plank, unless controlled. "No 2 was made as a substitute," and we are told that, in consequence of the teeth having "long fangs," the gum shrank so much in drying, that it was necessary to build on more material.

This thinning down spoken of was not owing to long-shanked teeth; on the contrary, the very reverse is the case: hence teeth with large shanks are preferred for rose-pearl base. There is less shrinkage, and the evaporation is facilitated. No. 2 was fully three-eighths of an inch thick over the cuspidati when taken from the evaporator; which was just as I was leaving Buffalo. I told Dr. H. that I thought it *ought* to be evaporated, and told him how to determine that, when filing and finishing it up. It was still in the *rough* when I left, and another plate, belonging to one of the other members of the committee, was still in the evaporator and quite green yet. By their own report, it is quite evident that none of these pieces were fully dried, or they would neither have smelt or tasted of that "exceedingly volatile matter." The wonder is they did not warp entirely out of the "drawer where they have since lain."

That the readers of the DENTAL COSMOS may have evidence of the practicability and value of rose-pearl as a base for artificial teeth, I am permitted to use the following letter from a gentleman who is still working rose-pearl by the very same process I taught in Buffalo. This letter was received to-day.

MORRISTOWN, N. J., Dec. 15th, 1868.

DR. MCCLELLAND.

SIR,—I presume you would be pleased to hear of my success in using rose-pearl base? Well, the piece you made, as you will recollect, in New York, after some two months' trial, decided me to take a license for myself, which I did in August last, since which time I have made and put in mouths fifteen pieces, which are now being worn. All of them are, as far as I know, giving satisfaction to those wearing them, and with no more trouble to me than I generally have with all persons for whom I make, or have made, gold, silver, or rubber dentures—the trouble being, as you know, to fit the plate to the mouth so as not to wound the mucous membrane by the plate edges. As far as making the plate is concerned, I think I have got it for full sets almost to perfection, and don't mind the trouble of it at all—would rather make two or three of this than one rubber plate.

I think I have made some improvements: one is the piece I cast in the back of the plate which enables me to watch the shrinkage, and, at the same time, not disturb the case, if right. I would not make a plate without this casting. As for the taste, some say the plate tastes for a little time, which passes away entirely; others say they experience no inconvenience from taste or smell. I have just been reading the report of the Buffalo Western New York Committee, in which they say they "do not desire to express any opinion," etc.; and yet they condemn the rose-pearl *in toto*. As to rose-pearl changing shape in the

mouth, I have not yet had any of that trouble, and, if I had, I don't think that one piece, or even two, would condemn all.

Yours, etc., E. O. PECK.

As rebutting evidence to the report of the Buffalo Committee, we beg leave to submit the following *home* testimony:

We, the undersigned, practicing dentists in the City of Louisville, Ky., are using Dr. J. A. McClelland's rose-pearl base and gum successfully. We like it very much, and it gives our patients satisfaction. *As perfect-fitting plates can be made with rose-pearl as it is possible to make with any other material*, and it has many desirable properties not possessed by any other base in use. It displays skill to advantage, and with a little practice is easily manipulated.

J. F. CANINE, GEO. B. FITTZ,
J. H. BEDFORD, C. M. WRIGHT,
J. T. LOVE.

Valuable improvements in working rose-pearl have been made upon the method referred to by Dr. Peck, which insures perfect-fitting plates without the attention formerly required during the evaporative stage.

We now press a plate of thoroughly seasoned rose-pearl to fit the mouth, thus obviating any shrinkage of the plate, which in sharpness of outline is a *fac-simile* of the plaster impression. On this plate the bite is taken and the teeth attached by a subsequent operation. The time required from taking the impression to fitting the plate in the mouth is one hour and a half, and to advance the case to the evaporative stage requires about the same length of time; after which little or no attention is required until the finishing process, which may be done in one hour. The time to evaporate fully is from thirty-six to forty-eight hours, according to the bulk of material.

J. A. MCCLELLAND.

LOUISVILLE, KY., Dec. 17th, 1868.

AMERICAN DENTAL ASSOCIATION.

ST. LOUIS, MO., Dec. 22d, 1868.

To the Editor of the Dental Cosmos:

BY resolution of the American Dental Association, convened in July last, the secretary was instructed to cause to be published in the dental journals the following form of certificate, to be presented to that body by delegates:

"This certifies that —— —— was duly appointed a delegate to the American Dental Association on the —— day of ——, 18—, by the Dental Society of ——, and that said —— —— is a dentist of good character and standing; and at this time in regular practice."

Respectfully,

EDGAR PARK, *Rec. Sec. A. D. Asso.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Dentinal Tissues.—In a discourse on "Epithelial Textures hardened with Calcareous Matter," Prof. Lionel S. Beale observes (*Med. Times and Gaz.*): "Let us consider the remarkable changes which occur during the formation of those very hard tissues which are infiltrated with calcareous salts, and in which the germinal matter plays a conspicuous part. In illustration, I will draw your attention to the formation of two of the hardest and most durable textures in the body—the enamel and dentine of the tooth. Although, in their fully developed state, these tissues are remarkable for the large proportion of earthy salts they contain, there was a time when each was composed of very soft organic matter only. Although no trace of germinal matter can be detected in the fully-formed dentine or enamel of the adult, at an early period of development these tissues were represented by masses of germinal matter only. Additional interest attaches to them on account of the different and conflicting views entertained as to their nature—some holding that enamel corresponds to the epithelial textures we have been considering, and that the dentine is more nearly related to bone and the connective tissues. According to this view, the neutral line between the two represents the position the basement membrane occupies in an ordinary mucous membrane. Huxley, on the other hand, and for reasons which seem to me insufficient and unsatisfactory, holds that both enamel and dentine are dermal tissues, and situated beneath basement membrane. Lastly, the position of the vessels as regards the dentine, the manner of growth of both tissues, and the fact of their origin in a collection of unquestionably epithelial cells, have forced me to conclude that both enamel and dentine are more nearly allied to epithelium than to any other tissues of the body, and that both are developed on the surface of basement membrane. The tooth grows in a manner so like a horn and a hair that it is difficult to believe that it is not closely related to these epidermic appendages, while there are not wanting instances in which an eminence covered with an epithelial texture seems to take the place of teeth. Hair and teeth are sometimes abnormally developed, and Mr. Darwin has remarked that the teeth of hairless dogs are deficient, and that over-hairy men have abnormal teeth.

"The masses of germinal matter concerned in the formation of the enamel and dentine are imbedded in epithelium, and are arranged in two curved lines, one within the other. The slight interval between these lines corresponds to the line of junction of the enamel and dentine in the fully-formed tooth. From this *neutral line* the two rows of masses of germinal matter move in opposite directions. In the outer one each mass diverges outward from the neutral line, while the different masses of germinal matter of the inner row converge slightly as they move inward.

"*Enamel.*—The formation of the enamel may be very successfully studied in the canine tooth of a young pig. Preparation 29 was ob-

tained from an injected specimen. The capillaries of the enamel membrane are beautifully injected with transparent blue injection, and the enamel cells, the germinal matter of every one having been well stained with carmine, are very distinctly seen. Each appears as a columnar or cylindrical body, not unlike a cell of columnar epithelium, with an oval mass of germinal matter near its distal extremity. As the germinal matter moves outward from the neutral line above referred to, it forms the column of soft material which is to become the enamel rod. After some extent of tissue has thus resulted, calcareous matter is deposited in that part of the column which was first formed. In the specimen, several columns can be discerned in which the change has already commenced. The highly refracting earthy particles contrast remarkably with the smooth, faintly-granular, organic matrix. The deposition of these earthy salts may be due merely to chemical change consequent upon the formation of free alkali in this, the oldest part of the organic matter. While this process is going on, the germinal matter in each little column is still moving outward, and forming more organic matter, which, in its turn, becomes calcified. This process continues until the formation of the enamel is complete, when the vessels of the membrane waste. A little uncalcified organic matter usually remains upon the outer surface of the enamel. The markings seen in a transverse section of enamel receive a simple explanation upon this view of the development of the enamel, and the outer uncalcified portion of the rods, when acted upon by acetic acid, swells up; and thus some have been led to infer the existence of a delicate membrane in this situation. Consult Mr. Tomes' 'Dental Surgery,' p. 268.

"*Dentine.*—The dentine begins to form before the enamel, but very soon after the formation of enamel has commenced the two operations go on together until a short time before the tooth emerges from the gum, when the production of enamel ceases, while that of dentine is not completed sometimes until advanced age. In certain cases—as, for example, in the canines of some of the lower animals and in the incisors of the rodents—the formation of both structures continues, so that in the teeth of the adult the development of the enamel and dentine may be studied as well as at a very early period of embryonic life in other cases. The oval masses of germinal matter taking part in the formation of the dentine are larger than those of the enamel, and the formed material produced by them appears as a continuous matrix instead of distinct and separate columns. Moreover, instead of each mass forming a separate oval body, a thin line of tissue is drawn out as the mass of germinal matter moves inward. These lines of soft tissue correspond to what are generally termed the dentinal tubes, and may be forcibly withdrawn, as in specimen, in which are also seen the corresponding 'tubes' which contained them. Calcification takes place by the deposition in the matrix of rounded globular masses of calcareous matter, which increase in size, and coalesce. A narrow portion of the matrix extending outward from each mass of germinal matter still remains permeable by fluids, and the process of calcification proceeds so much more slowly around this than in the rest of the matrix that the dentine produced refracts differently, and is harder in texture. The difference in appearance seen in thin sections has led observers to regard this slowly-formed layer of dentine as the wall of the supposed 'tube.' But in the recent state this 'tube' is occupied by uncalcified matrix, which

can be torn away from the calcified dentine. The calcification of the formed material corresponding to the 'tube' gradually proceeds, so that the space or 'tube' occupied by soft matter becomes narrower as the dentine advances in age, and at last in many cases the outermost portion becomes completely calcified, in which case there is no 'tube' at all, and the tooth is usually thoroughly dried before the section is made. The 'dentinal tube' of the prepared specimen results from the desiccation of the organic matter. The greater 'width' of the tube near the pulp, and its gradual reduction in diameter toward the surface of the dentine, the existence of soft solid matter in the 'tubes,' as was first demonstrated by Tomes, and the relation of the oval masses of germinal matter on the surface of the pulp to the dentine, are all accounted for in the explanation of the formation of the dentine above given.

"Is it reasonable to suppose that the dentinal tubes are for the conveyance of nutrient fluid from the surface of the vascular pulp to the dentinal tissue, when tubes do not fulfill a similar office in ivory, which is a tissue very analogous to the dentine? Surely, if the ivory of the elephant's tusk can be preserved without nutrient fluids being conveyed by tubes to every part of it, it is extremely probable that the dentine of other mammalian teeth is in like manner destitute of any special provision for its free irrigation in every part. These tissues undergo little change, and such an extensive system of nutrient channels as has been supposed to exist would be useless.

"The formation of the soft tissue of dentine and enamel affords an interesting example of the growth and movement in opposite directions of masses of germinal matter destined to produce a special structure, but toward a vascular tissue which recedes as they advance, and which wastes when the formation of the tissues and their calcification are completed."

Effects of Cultivation on Pigs.—In a review of Darwin's remarkable work on the "Variation of Animals and Plants under Domestication," the *Med. Times and Gaz.* gives the following summary on this subject: "The breeds of pigs, and the effects of cultivation in modifying the habits and the bodily shape of these animals, have of late years been carefully studied by von Nathusius and Rütemeyer. From their researches it appears that all the known breeds may be divided into two great groups—one represented by the common wild boar, which may be called the *Sus scrofa* group; while the other group is somewhat unfortunately named *Sus Indica,* as the wild aboriginal does not inhabit India, and the best known domesticated breeds come from Siam and China. Different breeds of the first group still exist in various parts of central and northern Europe; but these are now rapidly disappearing by being crossed with improved Indian breeds, especially the Chinese. It is believed that the Chinese have studied the domestication and breeding of their pigs for 4900 years; and hence, as might be expected, the pigs of that country display in an eminent degree the characters of a highly cultivated race. Nathusius tells us that the infusion of $\frac{1}{32}$d or even of $\frac{1}{64}$th of the blood of *S. Indica* into a breed of *S. scrofa* modifies the form of the skull of the latter. The modifications which the skull is capable of undergoing by cultivation are so remarkable, that we shall quote Mr. Darwin's paragraph on this subject, which contains a condensation of the views of Nathusius: 'The whole of the

exterior of the skull in all its parts has been altered; the hinder surface, instead of sloping backward, is directed forward, entailing many changes in other parts; the front of the head is deeply concave; the orbits have a different shape; the auditory meatus has a different direction and shape; the incisors of the upper and lower jaws do not touch each other, and they stand in both jaws above the plane of the molars; the canines of the upper jaw stand in front of those of the lower jaw, and this is a remarkable anomaly; the articular surfaces of the occipital condyles are so greatly changed in shape that no naturalist, seeing this important part of the skull by itself, would suppose that it belonged to the genus *Sus*. The whole head is much shortened; thus, while in common breeds its length to that of the body is as 1 to 6 in the "cultur-races," the proportion is as 1 to 9, and even recently as 1 to 11.' Mr. Darwin gives excellent portraits of the head of a wild boar and that of a highly cultivated Yorkshire pig (copied from Sidney's edition of 'The Pig,' by Youatt), which show at a glance the results of cultivation in modifying the shape of the skull. The influence of food in effecting these changes is clearly brought out by Nathusius, who finds, both by common experience and his own experiments, that rich and abundant food given during youth tends to make the head broader and shorter, and *vice versâ*. He shows, moreover, that the manner of obtaining the food, independently of the nature of the food itself, influences the form of the skull. All wild and semi-domesticated pigs begin in early life to plow up the ground with their muzzles, and thus to call into action the powerful muscles fixed to the back of the head, while in cultivated well-fed pigs this habit is not followed; and hence with each generation the back of the skull deviates more widely from the original form. It is doubtful how far such a change of habits will suffice to account for the great reduction in the length of the skull and for its concave front, although its influence to a certain degree is unquestionable; and Mr. Darwin points out that in many domestic animals—in bull- and pug-dogs, in certain breeds of cattle and sheep, in Polish fowls, etc.—there is a strong tendency for the bones of the face to become greatly shortened. Again, the nature of the food in the course of many generations seems to modify the length of the intestinal canal; for while in the wild boar its length is to that of the body as 9 to 1, in the common domestic boar it is as 13·5 to 1, and in the Siam breed as 16 to 1. Moreover, the number of mammæ, the period of gestation, and the age at which the teeth are developed vary with cultivation."

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"*Hypophosphites in the Toothache of Pregnancy.* By W. H. Sterling, M.D., of Burlington, N. J.—A lady under my care, in her first pregnancy, suffered most severely from toothache and facial neuralgia, consequent upon the rapid decay of her teeth, which had previous to this event been very good, been kept with scrupulous care, and had not for years required any attention from the dentist, until about the fourth month of pregnancy, when they began to decay with great rapidity, so that in course of a month seven were sufficiently decayed to need filling, and the neuralgic pain attendant upon their condition was such as seriously to affect her health.

"The ordinary remedies having been used with but merely momentary relief, it occurred to me, as her organization was highly nervous, and nature, with wise provision, ever takes care to supply the fœtus

with proper and ample nutrition, even at the expense of the mother, that perhaps the bone and nerve-forming elements in her system were not sufficient to meet the wants of both mother and child, and hence the failure to provide for the molecular changes in the teeth, the material being used for the bony structure of the rapidly growing fœtus. Acting upon this theory, I prescribed the hypophosphites of lime, soda, and potassa, together with the hypophosphite of manganese (having previously given iron) in two-grain doses each, three times daily, in the form of the glycerole. The relief was immediate and permanent, the pain entirely removed, and the decay of her teeth was arrested, and her general health was very much improved with the removal of her physical strength and mental vigor."—(*Amer. Jour. Med. Sci.*)

Rickets and Mollities Ossium.—In a notice of Dr. Hillier's work on "Diseases of Children," J. H. H. states (*Ibid.*): "In opposition to Trousseau, Dr. Hillier maintains that rickets and mollities ossium are not the same disease, and says 'the anatomical characters are quite distinct; both diseases are, it is true, characterized by a want of lime-salts in the bones. In mollities there is absorption of the earthy part of completely formed bone; the bone becomes more and more porous and brittle, while the cancelli become filled with a jelly-like, very vascular medulla. In rickets there is abnormal growth and extensive preparation for the development of bone, with an arrest of progress of ossification.' He admits, however, that in rare cases absorption of bone may take place in rickets. The progress of the two diseases likewise furnishes us with points of distinction: in mollities the case generally terminates in death; in rickets recovery is the rule unless the patient be carried off by some intercurrent disease, to which, of course, he opposes but a feeble resistance."

Rickets.—In relation to some further observations on this subject embodied in the St. Bartholomew's Hospital Reports, J. A. Jr. says (*Ibid.*): "In these papers, Dr. Samuel Gee investigates (1) the frequency of rickets, and the age at which it occurs; (2) latent rickets; (3) rickety deformities; (4) dentition in rickets; (5) the apyrexia of rickets; (6) the urine; (7) visceral disease; (8) the spasmodic disposition; (9) the nature of rickets; (10) the treatment; and lastly, adds a few notes upon the bibliography of the affection. 'The further observations' embrace the account of a *post-mortem* examination in a case of rickets, which proved fatal from acute tuberculosis. Dr. Gee's remarks are founded upon a very large experience—he examined 635 cases of rickets in one year at the Hospital for Sick Children—and he appears to have gone very thoroughly into the literature of his subject, so that his essay, while not professing to be a complete monograph, is really exhaustive upon the particular topics with which it deals.

"We quote in full Dr. Gee's remarks upon treatment, which seem of considerable importance: 'In cod-liver oil we possess a pharmaceutical agent worthy of a place beside iron, Peruvian bark, and mercury. We ought to lose no time over the symptoms of rickets; slight catarrh, diarrhœa, paleness, a tendency to fits—these will all disappear under cod-liver oil: give expectorants, purgatives, styptics, and the rickets will increase under our eyes; nay, occasionally, it will even develop *de novo* while a child is being treated for coughs, deranged bowels, and other apparently simple disorders.'"

"*Differences in the Chemical Reaction of the Tissues.*—Dr. Johannes Ranke, in the concluding chapter of his recent work (*Die Lebensbedingungen der Nerven nach Untersuchungen aus dem Laboratorium des Reisingericanum's in München*), makes some statements which cannot fail to interest histologists. He says:

"In a weak ammoniacal solution of carmine we have a delicate reagent, which enables us to point out with beautiful accuracy the differences in chemical reaction of the tissues. Beale had, as Ranke clearly and fairly points out, advanced the supposition that the staining of those portions of tissue which he designated germinal matter, might be due to their acid reaction. The truth of this supposition is, we think, now proved beyond dispute by Ranke. We thus have it easily demonstrated to us that while the axis cylinder of nerves is intensely acid, the reaction of the white substance of Schwann is decidedly alkaline; similarly in other tissues endowed with electro-motive power, we have demonstrated to us regular differences in chemical reaction, or regular arrangements of acid and alkaline constituents. The author thinks that he is justified in considering the regular chemical differences in the tissues as the source of their regular electro-motive properties."—(*Journ. of Anat. and Phys.* and *Ibid.*)

"*Variations in the Excitability of Nerves and the Nerve-tissue Change.*—According to Ranke, the nerve contains within itself a store of substance at whose cost it maintains its excitability, the duration of the excitability being proportionate to the amount of substance stored up. The substance consists of oxidizable and oxidizing constituents; their presence within the nerve renders it for a certain time independent of all external nourishment, although of course for its continued life it requires external supplies of oxidizable matter and oxygen. The nerve is capable, by means of chemical processes going on within it, to modify its excitability. Such changes occur during the continuance of nervous work, and result in a rise of excitability above, or a fall below, the normal, and coincidently we notice a change from a neutral or a weakly alkaline to a progressively increasing acid reaction. The appearance of the acid bodies is the cause of the variations in nerve excitability, which can be artificially imitated by acidifying living nerves, the first action of acids being to increase, and the ultimate action to diminish, nerve excitability. The acids which during nervous work induce the changes in excitability are to be reckoned among the causes of nervous fatigue (*ermüdende substanzen für den nerven*). The chemical processes which occur during the normal fatigue of nerves occur on the death of nerves, which, like nervous activity, is connected with an acid formation in the nerve substance. During its vitality the nerve exhales carbonic acid; as this gas possesses in high degree the power of diminishing the excitability of nerves, it probably may, under certain circumstances, be one of the causes of nervous fatigue."—(*Journ. Anat. and Phys.* and *Ibid.*)

"*Belladonna in Surgical Affections.*—Mr. Christopher Heath states that the action of belladonna, whether applied locally or given internally, is the same, viz., that by its action upon the vaso-motor system of nerves it diminishes the caliber of the capillaries, and thus directly reduces the vascularity of an inflamed part. Its action is thus peripheral;

and it is, therefore, the opposite of aconite, whose action is central or upon the heart itself. It does not follow, however, that the two drugs cannot be employed together; quite the contrary: the action of the one is to diminish the flow of blood to the part, while the other assists the tissue to get rid of the superfluity it already contains and resists its further entrance, and the two may in many morbid conditions be advantageously combined."—(*The Practitioner* and *Ibid.*)

"*Changes in the Nervous System which follow the Amputation of Limbs.*—Dr. W. H. Dickinson publishes (*Journ. Anat. and Phys.*, Nov. 1868) some investigations he has made relative to the changes which occur in the nervous system after amputation of the limbs. He expected to find that the portion of the encephalon which regulated the movements of each limb would be declared by a localized atrophy consequent on its removal. He failed, however, to discover any such lesion or any change of structure either in the cerebellum or great ganglia of the cerebrum. He next sought to trace evidence of change by commencing at the stump and working upward. Three cases are related in which he made careful examinations of the subjects.

"'Placing together,' he says, 'the several observations, it appears that when a limb has been absent, as the result of operation, for twenty or more years, the following changes have been found in the nervous system.

"'First, atrophy of the nerves of the stump, of which a large proportion of the fibres have perished, notwithstanding that, supported by the fibrous tissue which enters into their structure, they retain their bulk and external appearance almost without alteration.

"'Secondly, wasting of the nerve-roots, especially the posterior. The wasting of the tubes, in the absence of such fibrous investure as belongs to the mixed nerves, produces an attenuation, which in the case of the posterior root is very conspicuous.

"'Thirdly, a slight loss of bulk in the gray matter of the cord, on the side of the lost member, near the origin of its nerves, without any intimate change discernible by the microscope.

"'Lastly, a remarkable shrinking of the posterior column of the cord on the side of the mutilation, attended by a condensation of areolar tissue. The atrophy extends upward, and in the case of the loss of an arm can be traced into the medulla oblongata as far as the upper limit of the decussation of the pyramids.

"'The cerebrum and cerebellum remain unchanged.

"'I am aware that many details relating to this subject remain to be worked out, and I should have waited for further opportunities had not my purpose been forestalled by M. Vulpian, who has, since these observations were made, published two similar cases

"'His results differ very materially from mine. Both the cases he reports were of amputation of the leg, a little distance above the ankle. In one case the leg had been removed for 47 years, in the other for 20 years. In both cases M. Vulpian describes the spinal cord as slightly lessened in bulk on the side of the amputation. This diminution affected the gray matter generally, the white matter *with the exception of the posterior column.*

"'The cells of the gray matter were not altered in character, or appreciably in number. In one of the cases some spots of disintegration

were supposed to exist in the gray horn. No changes were detected in the nerves or nerve-roots.

"'My results differ from those of M. Vulpian in the atrophy of the nerves, posterior nerve-roots, and posterior columns of the cord, which were found in my cases but not in his. His cases and mine coincide in attributing a slight loss of bulk to the gray matter on the side of the mutilation.

"'Dr. Waller long ago pointed out that nerves separated from their centres rapidly became atrophied. With regard to the spinal roots in particular he found that when an anterior root was cut, the part retaining its connection with the cord remained unaltered, while the outer extremity wasted. After dividing a posterior root, the reverse took place; the central end wasted, the peripheral end retained its structure. From these and other experiments, Dr. Waller was led to conclude that the outer portion of the severed posterior root owed its retention of structure to the ganglion to which it was attached, while the nutrition of the motor root depended on the cord.

"'The facts brought forward in this paper appear to show that these conclusions need modification. It would seem that the posterior root may waste though still in connection with the ganglion, the anterior though still in connection with the cord. The ganglion therefore is not the sole controller of the nutrition of one root or the cord of the other. It appears that long disuse of a nerve is sufficient to lead to its atrophy, notwithstanding that those nervous structures which more immediately regulate its nutrition are complete.

"'There are some points which as yet may be left without explanation, namely, the greater atrophy of the sensory than of the motor roots, and the peculiar wasting of the posterior columns, passing vertically up the cord, and in the case of loss of the arm affecting the medulla, a course not corresponding with that of the sensory fibres, which soon lose themselves in the gray matter.'"—(*Am. Jour. Med. Sci.*)

Lead Paralysis.—In one of his instructive lectures "on Diseases of the Nervous System" (*Med. Times and Gaz.*), Dr. Wilks gives the following on this subject: "I shall briefly allude to lead paralysis, because the disease so exactly resembles that which I have just described, 'Progressive Muscular Atrophy,' that it is very often impossible to distinguish between them. If the metal has been thoroughly implanted in the system, a fatal result may ensue. All the tissues of the body degenerate, the skin assumes a remarkably waxen appearance, the nerve centres more especially suffer, and the patient becomes at last paralyzed both in body and mind. A mania or dementia may result, accompanied by epileptic fits. In a less degree the effects are constantly seen, as in the dropped wrist of the painter, followed by a paralysis of the whole arm, in which the muscles waste just as in the disease described. I have more than once seen a patient admitted and treated for progressive muscular atrophy, in whom there has been a lead line on the gums and a good history of plumbism. It might be thought that so analogous a result might elucidate the pathology of the idiopathic muscular atrophy; but as yet it proves no more than that nutrition is affected through the influence of the sympathetic nerves on the blood-vessels. Lead, as you know, is given to arrest hemorrhage, and acts by constringing the vessels. You can therefore see how its overaction or its continued action

would produce an atrophy of the tissues. Duchenne states in his work that we have one means by which we can distinguish between lead palsy and the idiopathic atrophy. In the latter, as I have told you, the most remarkable wasting is seen in the interossei and other muscles of the hand, so that the claw shape is produced. In lead palsy the effect is most marked on the extensor longus digitorum, and as this muscle, when healthy and excited by faradisation, is stated by Duchenne to act only on the first phalanges, and has no influence on the second and third digits, it consequently follows that if this muscle is paralyzed, as in plumbism, and the arm and wrist be supported on a table, the fingers can still be extended or raised, which cannot occur in the progressive muscular atrophy when the interossei and lumbricales are affected.

"A few years ago there was a woman in the hospital who had long worked in lead, and who had become at last completely paralyzed. The limbs had gradually wasted, and became at last utterly powerless, and at the same time her mental faculties had almost gone. The post-mortem examination showed a marked wasting both of the brain and spinal cord."

Mercurial Paralysis.—Respecting this, the same author says (*Ibid.*): "There are many other poisonous substances, more especially the metals, whose effects in small doses might be advantageously studied in connection with idiopathic diseases. I have spoken of lead, since the results of its action resemble so closely those of a well-known disease, and I shall now just allude to mercury, as its poisonous effects have occasionally been referred to spontaneous causes, and because, in a complete saturation of the system, the nervous centres seem to be most strikingly affected. Formerly the effects of mercurial vapor were constantly seen in looking-glass makers and water gilders, who exhibited the well-known mercurial tremor, and these same persons, if they persisted in the employment, became at last quite shattered in health. Such instances are at the present time by no means numerous. I have seen, however, within the last few years, two cases showing in a much more striking manner the destructive nature of mercury, but in neither case were they due to the inhalation of the metallic fumes as formerly witnessed.

"The first case was that of a man admitted into the hospital for a form of general paralysis from which he was suffering. It was discovered that he had been in the habit of packing the skins of animals, and that these had been washed with an acid solution of mercury. For three years he had been employed thus, when he began to experience a general muscular weakness. He could scarcely walk, and, when attempting to do so, it produced a general tremulousness over the whole body. When lying down, he had spasmodic movements of the chest and of the muscles of the body, resembling those of chorea. He gradually became more feeble, delirious at times, and he afterward fell into a state of unconsciousness. The post-mortem examination showed no evident disease of any of the organs, but a chemical analysis by Dr. Taylor proved the existence of mercury in many of the tissues of the body.

"A more marked case than even this of the destructive effects of mercury on the body I had an opportunity of seeing in St. Bartholomew's Hospital. A young man had been engaged in the laboratory in the preparation of mercurial methide for about three months, when he

began to complain of dimness of sight, numbness of the hands, and general weakness. These symptoms increased, until at last he was obliged to be sent to bed. When I saw him he was almost completely paralyzed; he was lying prostrate in bed, perfectly helpless, being scarcely able to move either his arm or legs, and there was paralysis of the bladder. He could not speak, and was quite deaf. The heart's action was quick and feeble. The mouth was not sore, but I was informed that the gums had been at one time spongy, when there was also fetor. He got weaker and weaker, and died in about a fortnight.

"Another young man, employed in the manufacture of the same article, was also similarly affected, the symptoms being those of a complete paralysis of body and mind. He lost all feeling, all power of motion, became deaf, unable to speak, and quite idiotic."

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Hyperæsthesia and Neuralgia.—In relation to these derangements, Dr. Wilks observes (*Ibid.*): "We meet with cases of over-sensitiveness of a part, or hyperæsthesia. This may have its origin in spinal disease, more especially in that arising from injury or shock, in which we consider that a membranous inflammation may have been set up. If no such explanation can be given, hyperæsthesia may be regarded as a functional affection, and is generally associated with the hysterical condition. In fact, altered states of sensibility are some of the most characteristic symptoms of hysteria.

"Local pains in the course of nerves might serve for the subject of a volume. We endeavor, by tracing the nerve to its root, to discover any source of irritation. If we are unable, we say the complaint is functional—we style it neuralgia. If the pain be due to a morbid or over-sensitiveness of the nerve centre, we style the case one of hypochondriasis. The pain may be in the trunk, its branches, or the periphery. In all these varieties we use the term neuralgia. When we consider that the pain is in the muscle, we adopt the term myalgia or myosalgia, and I think it convenient to have a name for muscular pain, or muscular rheumatism as it is often called. A neuralgia may or may not be accompanied by hyperæsthesia; in some cases there is an over-sensitiveness of the painful part—in others relief is obtained by hard rubbing or pressure. So little is positively known of the actual state of the nerve that we are compelled to adopt the simple term neuralgia, as though it constituted the disease. Thus there is the well-known painful affection of the leg known as sciatica; but you may meet with cases where the anterior crural is the nerve more especially affected. You may also not unfrequently meet with a corresponding disease in the arm which is styled brachialgia. I have seen within a very short time three such cases; and it is remarkable that the right arm was affected in all of them—in one it was more especially the ulnar nerve, and in another the musculo-spiral, which was implicated. Two of the patients were of gouty constitutions. Sacral and lumbar neuralgia are also very common.

"As regards the face, the complaint is well known under the name of tic douloureux; the fifth is the nerve involved, and according as a particular branch is affected so is there a special name affixed to the disease. The pain in the face and head is often much more diffused than the distribution of the trifacial will explain, and this is accounted for by its connection with the seventh pair and other nerves. It may be,

however, in cases of fixed pain at the back of the head, that the cervical occipital is especially affected. These neuralgias of the face may arise from an organic cause, or from reflected irritation, as a carious tooth. In very many cases, however, we are compelled to call the neuralgia functional, and remain quite innocent of any explanation. It is of course always pleasing to a medical man when he can discover a definite cause for a long-continued ailment; for he not only, perhaps, at once is able to assuage the patient's sufferings, but he can indulge in a very praiseworthy self-satisfaction upon the solution of a scientific problem. In very many organic diseases which finally become self-evident, obscure symptoms may have existed for a long period, and thus in a great many cases of obstinate pains a cause may eventually show itself. A very careful medical man, however, may often discover a local cause for a pain which a more careless practitioner has overlooked. Thus caries of the teeth will give rise to neuralgic affections far distant from their origin in the decayed teeth. Of this kind Mr. Salter has collected a large number. It is your paramount duty, therefore, in all cases of neuralgia of the face, head, neck, and adjoining parts, to examine the mouth, in order to discover if a carious tooth be at the bottom of the mischief. I think, however, judging from my own experience, that you do not require any hints in this direction, for I generally find that medical men are quite ready to extract teeth for all facial pains, and, I am sorry to say, often without success. If we regard the subject without bias, we must say that carious teeth do certainly give origin to various neuralgic affections, but we must also confess that these affections are often quite unconnected with the teeth; this is shown by the fact of their constant extraction without any relief to the patient. I have seen many cases where every tooth in the head has been pulled out for the treatment of neuralgia, but without the slightest benefit whatever. As a proof that many neuralgias are purely functional, we must remember their intermittent character. A patient may have a most violent neuralgia, lasting for days or weeks; this will entirely disappear and again recur. This intermission may go on for years."

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Section of Inferior Dental Nerve for Tic Douloureux.—In the clinical record of King's College Hospital (*Lancet*), it is stated that "in the case of an elderly man who had suffered from tic for several years past, the inferior dental nerve of the right side was divided. Stretching the lips asunder with two fingers of the left hand, and feeling for the mental foramen with one of these, Sir William Fergusson cut down upon the nerve with a small tendon knife, which he passed quite into the canal. He had performed a similar operation four months ago, and it was followed by relief for several weeks. It is not Sir W. Fergusson's experience that there is any advantage, as supposed by some, in removing a portion of the nerve: simple division does quite as much good. The relief is always temporary: at least he has met with but few exceptions to this rule. It is noteworthy that it often happens that no relief is obtained for the first week after the operation; then the pain gets gradually less, and the patient may be free perhaps for three months. As a general rule, the oftener the operation is repeated, the shorter is the period of immunity procured by it. This man, it should be said, had been under every variety of treatment without effect."

Dentistry in Japan.—In some interesting notes on the State of Medicine in Japan, Dr. Alex. M. Vedder writes (*Am. Jour. Med. Sci.*): "It might not be amiss, in the course of these remarks, to add a few words concerning a kindred profession to our own. I refer to dentistry. This *trade*, for such it may be more fitly considered in Japan, is carried on by a very low class of people, usually peripatetic in their habits, and who carry with them a box covered with brass ornaments, by which their occupation is recognized. Now, the extraction of a tooth by one of these gentry is regarded by the Japanese as a capital operation, and not without reason, if the information given me be reliable, that death (from tetanus, I presume) is not unfrequently the result. The tooth is extracted by the operator's fingers, but not until it has been well loosened by means of a stick and a mallet vigorously wielded. The operation is seldom performed, but I saw some teeth in possession of one of these charlatans that had large portions of the alveolar process attached. In the face of these facts it can scarcely be credited that artificial teeth, sustained by *atmospheric pressure*, have been in use from time immemorial. These teeth are carved out of sea-horse ivory, the molars being plentifully studded with little brass bosses, and the whole strongly mounted upon a base cut from the hard shell of a species of gourd, and carved to conform to the irregularities of the gums and palate. I have several sets of these teeth in my possession; they are not expensive, the very best, a complete upper set, costing about five boos, or about one dollar and sixty cents. Colossal fortunes are not accumulated from dentistry in Japan, as may be inferred from the foregoing."

Secondary Syphilitic Contamination.—In a notice of Dr. Davidson's observations in Madagascar, the *Med. Times and Gaz.* says: "Undoubtedly, however, the most interesting portion of the report is that relating to syphilis. This appears to be very common, not in its primary form, for which the natives do not appear to care, but in peculiar secondary manifestations which would seem to be capable of direct transference. The peculiar eruption is condylomatous, not, however, limited to any single portion of the body, but spread all over; it is both hereditary and acquired: when hereditary, manifesting itself even when the child is several years old; when acquired, usually without any history of primary hard sore, although capable of giving rise to such by inoculation. Further, such eruptions are followed by the well-known sequelæ of syphilitic infection, ulcerated throat, sunken nose, caries of bone, etc. The disease would, in fact, seem to closely resemble that known as the yaws. Ordinary contact, altogether apart from sexual intercourse, is sufficient to insure the spread of the disease, as among childish playfellows of tender years."

Chloro-acetic Acid as a Cauterizing Agent.—The *Med. Times and Gaz.* gives the following summary of some experiments, by Dr. F. A. Urner, with this agent: "Dr. F. A. Urner published a dissertation on the use of this acid, which is now reprinted by Dr. Marquart. He recommends surgeons to carry it in their pockets in a suitable tube and case. He compares the effects of various fluid cauterizing agents upon thin leather stretched on a board. The fluids were dropped in single drops on the leather. It is stated that a concentrated solution of nitrate

of silver and of caustic potassa had no very destructive effect, as also monochloro-acetic acid, but the nitric acid and the dichloro-acetic acid destroyed the surface of the leather. However, there was this difference—that when nitric acid was used there was, beyond the rapidly destroyed spot, a zone of irregular extent of more or less injured aspect, while the chloro-acetic acid did not transgress the original limits of its operation, and the effect was less extensive, but more exact. In another series ef experiments the strong nitric and strong chloro-acetic acid were both applied with a *glass stick*. The nitric acid caused intense corrosion at the point which was touched, but there was in addition a less marked and irregular zone; the dichloro-acetic acid caused an equal destruction confined to one spot. Experiments with the soles of boots gave the same results. Again, coagulated albumen was used, and it was found that the nitric acid spread to a far greater extent through this substance. Hard-boiled eggs gave no different result. Solution of chloride of zinc was found less effective than dichloro-acetic acid. Next the ears of live rabbits became the objects of a series of experiments, and again the limitation of the effect of chloro-acetic acid to one spot was noticed. Fuming nitric acid caused diffused inflammation spreading beyond the original place of application. The author concluded from all these experiments that strong nitric acid and chloro-acetic acid are equally active caustics, but the latter has the advantage of causing less inflammation in the circumference, being confined to the spot where it is applied. Dr. Urner next describes experiments on warts and corns. Hospital patients, who had tried other remedies in vain, were cured by the chloro-acetic acid. Lupus and condylomata were also treated with it, with the caution of using less concentrated solutions in the beginning. The author confidently asserts that the acid will prove a very energetic and safe caustic for all kinds of neoplasmata, being less dangerous because less diffusible to the circumference. The pain is also less than with other caustics, the cicatrization more favorable, and the surgeon has it in his power to limit the effects as he pleases. In conclusion, he enumerates warts, corns, telangiectases, vascular tumors and nævi, condylomata, papillomata, and lupus as the diseases for which the new remedy is applicable."

"*Antidote for Aconite.*—In the London *Lancet* for July, 1856, we find a paper on the poison of aconite, by Dr. Headland. After stating cases to show how small a dose of aconite—viz., fifteen drops—has proved nearly fatal, he closes with a brief summary of the treatment. As soon as the poisoning is suspected a large quantity of animal charcoal is administered. The aconite is quickly taken up and obstinately retained by this agent. Dr. H. thinks an emetic of zinc should be given after the charcoal, and not in the first instance. Then he advises the free use of brandy and Ammonia."—*Materia Medica and Therapeutics, by Thos. D. Mitchell, M.D.*, p. 98.—(*Journal of Materia Medica.*)

Artificial Respiration by the Marshall Hall Method.—W. H. Short, L.R.C.P. Edin., records in *The Lancet* the following case of interest in furtherance of Dr. Ellis' opinion of the "ready method"—viz., "that it should be tried *well*, and not merely from *two to five minutes*." "On Sunday morning, October 18th, I was sent for to attend a patient, Mrs. B——, aged thirty-four, in her sixth confinement. On examination, I

found an arm presenting, and therefore immediately proceeded to turn. There was no difficulty in finding one of the feet; the hips were easily expelled during the next pain, but the shoulders seemed to be for several minutes completely fixed The head was a very large one. It was a long time in passing through the pelvis, and from the pressure on the cord the child's body soon became livid. When born the infant appeared perfectly lifeless. I immediately commenced the 'ready method,' and continued it for nearly *three-quarters of an hour* before my efforts were rewarded by the slightest gasp. The infant then gave a deep sigh, and after continuing the treatment for a quarter of an hour longer, I was able to hand it to the nurse, who with the mother had been convinced that the child was dead—the former exclaiming, 'It's no use rolling the poor thing about like that, sir;' and the latter, 'I am sure my baby's dead, for it doesn't cry.' The child is living and doing well. I may add that two years ago I had a similar case, in which the 'ready method' was successful after half an hour's trial."

Artificial Respiration by a New Method.—"At the meeting of the Medico-Chirurgical Society on Tuesday last there was an animated discussion upon the best mode of resuscitating the drowned. Dr. Bain, of the Poplar Hospital, brought before the Society his new 'ready' method, and supported its claims by the details of various experiments he had made on the dead subject. As far as we understand Dr. Bain's method, it is the modification of a plan introduced last year by Pacini. He proposes to raise the ribs and thorax by means of a hand of the operator placed in each axilla, with the thumb on the clavicle. It will be remembered that Dr. Silvester directs traction to be made by the arms, which he uses as 'handles to open the chest.' Dr. Bain states that his experiments prove that more air can be introduced into the chest by his method than by any other."—(*Med. Times and Gaz.*)

Oxygenesis.—Among other methods for generating oxygen gas, Prof. C. A. Joy gives the following in the *Journ. of Applied Chemistry:* "It is sometimes required to prepare oxygen for medical uses, and for this purpose it is desirable to have a method for its evolution without the intervention of heat. By employing the binoxide of barium, the bichromate of potash and sulphuric acid, we are able to liberate oxygen in considerable quantity as easily as we can obtain hydrogen from water by means of zinc and sulphuric acid, but the materials are expensive.

"Schönbein once exhibited to us an experiment in his laboratory which we have never seen attempted elsewhere. It may suggest a method for the preparation of oxygen on a large scale. When spongy ruthenium is plunged into chlorine water, oxygen gas is given off in large quantities, and this will continue as long as there is any chlorine present in the water. The hydrogen of the water goes to the chlorine, forming hydrochloric acid, and the oxygen is set free.

"Schönbein was of the opinion that by passing a continuous stream of chlorine gas into a vessel containing water and spongy ruthenium, oxygen gas would be given off in great quantity. As the resulting hydrochloric acid could be used for the preparation of chlorine gas, and as the spongy ruthenium is not at all affected, the expense of this method resolves itself into the cost of the chlorine and the original outlay for the spongy ruthenium."

Steel, and its Varieties. — "Steel, it is asserted, has become the name of a genus composed of a large variety of species. Ordinary steel is a compound of iron and carbon, the latter ingredient making from one to one and a half per cent. of the metal. The carbon, however, by later manipulations, is replaced by other chemical elements and the results are steels described as alloys of iron and of tungsten, manganese, chromium or titanium respectively. Other substances also can enter into combination with iron, as is the case with the silicon steel of the French chemists, where the iron is combined with silicon, the base of flint. Drawing an analogy from this latter compound, it is argued that boron, the base of borax, will also combine with iron, and that the tools possessing most extraordinary hardness and cutting powers recently made in Glasgow are composed of boron steel. The instruments mentioned, it is asserted, performed thirteen times the amount of cutting work of an ordinary tool of carbon steel."—(*Philadelphia Ledger.*)

Toughening Plaster.—B. H. M., of N. H., writes to the *Sci. Amer.* "that he has succeeded in making plaster casts so tough that they will bear the driving of a nail into them without cracking, by immersing them for a sufficient time in a hot solution of glue, to permit its permeating the entire mass."

"*Ink.*—W. R. Shelmire, of Philadelphia, writes us that he has succeeded in making a good copying ink from common violet writing ink, by the addition of 6 parts of glycerin to 8 parts of the ink. Using only 5 parts of glycerin to 8 of the ink, he has found the ink to copy well fifteen minutes after it has been used. He says with fine white copying paper the ink will copy well without the use of a press."—(*Ibid.*)

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The Variation of Animals and Plants under Domestication. By Charles Darwin, M.A.F.R.S., etc. Authorized edition, with a Preface by Prof. Asa Gray. In two volumes, with illustrations. New York: Orange Judd & Co.

This work strikingly exemplifies the value of theory in promoting research and increasing human knowledge, for whatever may be thought of the author's doctrine of "natural selection," there can be no question of the paramount importance of the facts presented in its favor. These are so numerous and instructive as to be of general interest to all classes, from the children with their pets to the wisest philosopher, and from the more purely speculative to the most practical intellect. The information this book affords is of special import to the agriculturist, naturalist, physiologist, ethnologist, and physician, in demonstrating the great plasticity of living organisms and the facility with which they are moulded and modified by the force of circumstances. It points out the variability of particular parts as well as of the whole structure of plants and animals, and shows the mutability of the hard with the soft tissues of the latter, extending to a marked change in the form of the skull and facial angle, even in the pig. Besides, it treats of the great problems of production, preservation, inheritance, development, and reversion of organic forms, thus presenting *in toto* a vast

fund of knowledge on biological science, which cannot fail to lead to a clearer conception of the laws of life, better cultivation of plants and animals, an improvement of the human race, and a higher civilization. Indeed the practical and theoretical value of this work is so great that it should be in every library in the land, and should be studied by every one with any pretension to learning or desire for a knowledge of living beings, especially those interested in agriculture, medicine, or natural history. It is written in a clear, unpretending style, with few technicalities, is fully indexed, well printed, and neatly bound.

The Use of the Laryngoscope in the Diseases of the Throat: with an Essay on Hoarseness, Loss of Voice, and Stridulous Breathing in relation to Nervo-muscular Affections of the Larynx. By MORELL MACKENZIE, M.D., London, M.R.C.P., Physician to the Hospital for Diseases of the Throat, and Assistant Physician and Co-lecturer on Physiology at the London Hospital. Second edition, with additions, and a chapter on the Examination of the Nasal Passages. By J. SOLIS COHEN, M.D., Author of "Inhalation; its Therapeutics and Practice," etc. With two Lithographic plates, and fifty-one Illustrations on Wood. Philadelphia: Lindsay & Blakiston, 1869.

This is an instructive monogram on an interesting specialty. The author gives the history of the invention, with a description and drawing of the laryngoscope and its accessories, besides directions for its application, and a record of cases with their treatment. The additions of the editor on the same and collateral subjects, materially enhance the value of the work. Though its contents are of more immediate practical interest to the physician than dentist, yet the so-called "*self-holder* or *fixateur*" depicted here for holding the laryngeal mirror after introduction into the mouth, might perhaps be used to advantage in dental operations. The book is gotten up in attractive style, with superior paper, print, and engravings, and ornamental binding.

Pronouncing Medical Lexicon, containing the correct pronunciation of terms used in Medicine and the Collateral Sciences, with addenda, containing Abbreviations used in Prescriptions, and a list of Poisons and their Antidotes. By C. H. CLEAVELAND, M.D. Eleventh edition. Philadelphia: Lindsay & Blakiston, 1869.

Of this excellent little handbook it is unnecessary to say more than to recommend it to every one interested in medical terminology. It will prove extremely useful to students and practitioners of dentistry as well as of general medicine.

The Physician's Dose and Symptom Book, containing the Doses and Uses of the principal articles of the Materia Medica and Officinal Preparations. Also Tables of Weights and Measures, Rules to proportion the Doses of Medicines, Common Abbreviations in Writing Prescriptions, Table of Poisons and Antidotes, Classification of Mat. Medica, Pharmaceutical Arrangement, Table of Symptomatology, Outlines of General Pathology and Therapeutics. By JOSEPH H. WYTHES, A.M., M.D. Eighth edition. Philadelphia: Lindsay & Blakiston, 1868.

Neither does this little manual require much comment, as its title sufficiently indicates its scope, and the fact of its having reached the eighth edition attests the high appreciation in which it is held by the profession. The mechanical execution of these books is also good and creditable to the publishers.

THE

DENTAL COSMOS.

NEW SERIES.

Vol. XI. PHILADELPHIA, MARCH, 1869. No. 3.

ORIGINAL COMMUNICATIONS.

ACTION OF ANÆSTHETICS ON THE BLOOD CORPUSCLES.

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In the October number of the Dental Cosmos a report was presented of a series of experiments performed by me, on a number of animals, with the view of ascertaining whether the assertion made by a distinguished experimentalist and scientist of England, that nitrous oxide, even under the most delicate manipulation, would prove destructive to life, could be possible. These experiments, which clearly demonstrated the assertion to be unfounded, were not performed in private, but in the presence of a number of gentlemen whose experience in the use of anæsthetics and whose scientific knowledge made them competent judges. First performed before the members of the Odontographic Society of Pennsylvania, they were repeated, after an interval of three weeks, on the same animals, in the presence of the members of the Biological and Microscopical Department of the Academy of Natural Sciences.

A month subsequent to the last-named occasion, one of *these animals*, a rabbit, in the presence of a number of gentlemen, was placed under the influence of nitrous oxide, and kept in a profound state of narcosis for *one hour and five minutes*, by alternating atmospheric air and nitrous oxide, removing the inhaler ever and anon for that purpose. Without question the animal could have been kept in the same condition double or treble the time without injury to it, for in a few minutes after removing the anæsthetic entirely, the animal was restored to consciousness, and leaped from the table to the floor, and for a number of weeks after this ran about my premises in a healthy and lively condition, and no doubt would have been still alive had I not demonstrated on him before the students of the Philadelphia Dental College the absorption

of fats by the lacteals of the villi of the intestines, below the duct of the pancreas, and also the action of the heart and lungs; necessitating as this did opening into the abdomen and thorax, life of course became extinct.

When under the prolonged influence of nitrous oxide referred to, one of the blood-vessels of this animal was opened for the purpose of examining the blood corpuscles under the microscope, and ascertaining whether they had become disintegrated or any change had taken place in their form. On examination no perceptible difference was observable even after this lengthened exposure to the anæsthetic, when compared with the blood of another rabbit, which was not under its influence. This result induced me to examine into the statements made by Dr. Sansom, relative to the action of anæsthetics on the blood corpuscles in his highly interesting and able work on chloroform.*

Prior to giving a description of my experiments in this direction, it may be proper to briefly refer to the prevalent theories on the physiological action of anæsthetics; also to the experiments performed and conclusions arrived at by Dr. Sansom. The view generally entertained is that first suggested by Flourens, that these agents act directly upon the nerve centres, producing regular and progressive modifications in the functions of the brain and spinal axis, first affecting the cerebral hemisphere, then the power of co-ordination in the cerebellum, then the conduction of sensation and motion in the spinal cord, and lastly, if the agent is pushed so far as to decidedly impress the medulla oblongata, suspension of respiration and circulation.

Dr. John Snow, regarding this theory as an erroneous one, and recognizing ether, chloroform, and other anæsthetics as non-supporters of combustion, advanced the theory that these agents interfering with the introduction of oxygen into the system, induced their effect by the suspension of oxygenation, he therefore asserted that "narcotism is suspended oxygenation." This view is embraced and strongly advocated by Dr. B. Ward Richardson (the friend, biographer, and editor of his work on "Chloroform and other Anæsthetics"), and in England, apparently, is being very generally adopted by writers on this subject; Dr. Kidd, who has devoted much attention to the study of the action of chloroform, is, however, a prominent exception.

Dr. Sansom, accepting this theory, and knowing that nitrous oxide is not only an anæsthetic but a supporter of combustion, recognized the necessity of presenting something more conclusive in the support of the view, than had heretofore been offered. He therefore in a paper read before the Royal Medical and Chirurgical Society, in 1861, as the result

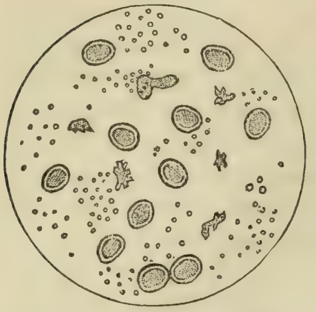
* Chloroform, its Actions and Administrations. By Arthur Ernest Sansom, M.B., London: Lindsay & Blakiston, Philadelphia.

of certain experiments performed on the blood corpuscles of man and animals out of the body, attributed the influence exerted by anæsthetics on the nervous system to their acting directly upon the blood corpuscles, by modifying their form and integrity, and indirectly upon the nervous system through this altered condition of the blood, by interfering with its oxygenation. In his work he describes a series of six experiments; placing on glass slides, under a quarter-inch object-glass, human and frog's blood, and subjecting them to the *direct contact* of alcohol, ether, and chloroform, which resulted quickly in the disintegration of the blood corpuscles, leaving nothing but their nuclei and débris of the walls of the corpuscles. From these experiments on blood *out of the body,* he states in the work referred to: "The effect therefore of these agents upon the blood is solution — destruction. At first there is a change induced in the cell itself and upon the nucleus (in the case of frog's blood). The globuline of the blood is acted upon as it were by a caustic. Finally the old corpuscle is destroyed and its coloring matter set free." * * * From the foregoing facts and other considerations, the author considers that certain conclusions in regard to the action of anæsthetics are warrantable. Anæsthetics are agents which when absorbed into the circulation exert an influence upon the blood. They are shown to have the power of altering its *physical character* and *physical properties.* By an action upon its constituent (proteinous) elements, they tend to alter and by a profounder action to destroy its organic molecules. Its physical perfection being interfered with, its function is held in abeyance; the changes which contribute to constitute perfect life are retarded. Narcosis ensues; and is due, not to the influence of a circulating poison, but to the influence of an altered blood. Further on he adds: "Narcotism (or to speak more particularly, chloroform narcotism) is due not to a special poison that 'mounts up to the brain,' but to an altered blood. Then 'narcotism is a suspended oxygenation.' Whatever produces to a certain extent insufficient aeration of the blood, produces narcosis; and whatever produces narcosis, produces by some means or other imperfect aeration of the blood."

In drawing these conclusions, of an altered condition of the blood, from appearances presented by the blood *out of the body,* Dr. Sansom evidently leaves it to be inferred that somewhat if not exactly analogous results are produced on the corpuscles *in the body,* when human beings or animals are under the influence of anæsthetics by inhalation. After a patient, oft-repeated series of experiments performed by me during the past three months, not only on blood out of the body, but also in cases in which human beings and animals have been placed under the influence of ether, chloroform, and nitrous oxide, and the blood drawn from them *prior* to and *after* the administration of these agents has been carefully *examined* and *compared,* the results obtained compel me

to take very decided exceptions to such conclusions being justifiable in the premises.

Fig. 1.



Frog's blood placed upon the slide, and chloroform brought in direct contact with it.

First Series.—The experiments were as follows: In my examinations of the blood of man and animals, when ether and chloroform were brought in direct contact with it out of the body, under a fifth objective, the discharge of the nuclei and the disintegration of the corpuscles have invariably occurred, and in the frog leaving a result similar to that which is presented in the accompanying drawing (Fig. 1), from one of my specimens, wherein it will be observed that the field is occupied by the nuclei, débris of disintegrated globuline and corpuscles, in which the change of form, size, and other characteristics are most striking.

Second Series.—On placing, however, two glass slides containing frog's blood over watch-crystals, one holding chloroform and the other ether, and covering them with glass finger-bowls for half an hour, thus exposing one to an atmosphere of ether, and the other of chloroform, I found, on removing the bowls, and permitting the bloody sides of the slides to remain downward, until all the ether and chloroform had evaporated, that no disintegration or marked change in the form of the corpuscles was observable under the microscope, on comparing them with the blood of a frog unaffected by an anæsthetic. This forcibly demonstrates the difference between exposure to *direct contact* and the *vapor* of chloroform, even out of the body.

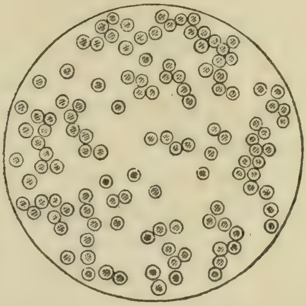
Third Series.—Over and again in the presence of a number of gentlemen, I have placed frogs under the influence of ether, chloroform, and nitrous oxide, and examined their blood corpuscles immediately after without finding any disintegration or change in the form of the corpuscle. In one instance, a frog was so completely narcotized by chloroform that it died; the thorax of the animal was opened, the lungs cut out, and the blood obtained directly from that organ, and even here, where, if the inference of an altered blood was correct, there should have been discharge of nuclei, disintegration, or *marked* change in the form of the corpuscle, nothing of the kind was evident, as will be seen by the accompanying illustration, drawn from the slide on which the blood was placed. (Fig. 2.) As already intimated, the experiments in this direction have been prosecuted on every available occasion within the past few months; and I have not confined myself to frogs, but, in the course of vivisections on a large number of animals (rabbits, dogs, cats, and pigeons), to illustrate my course of lectures on physiology this winter,

when these animals have been placed under the influence of ether or chloroform, their blood has been examined and no change in the form of the corpuscle has been evident.

Fig. 2.

Corpuscles from the lungs of a frog which died under the influence of chloroform.

Fig. 3.



Corpuscles of a patient under the influence of chloroform.

Fourth Series.—The examination of the blood of a number of human beings, drawn prior to and after having been under the influence of ether, chloroform, or nitrous oxide, for the extraction of teeth, has yielded similar results, as will be evident from the accompanying illustration of the blood, obtained from a patient (Fig. 3), while under the influence of chloroform. Any one accustomed to microscopical examinations will recognize the normal characters of the corpuscles, so far as it is possible to present them in a wood-cut.

The results of these investigations were recently presented to the members of the Microscopical and Biological Department of the Academy of Natural Sciences, illustrated by a large number of microscopical slides, and although some time has elapsed since the blood was placed on many of them, the corpuscles retain their form unchanged.

Presenting the statements for what they are worth, and desiring that others may either confirm or disprove them by experiments of their own, as carefully conducted and as frequently repeated, and not merely performing a few experiments and then drawing conclusions which they would not be warranted in doing, I would suggest to such that there are two modes of preparing blood for microscopical examination, each of which has been tried in my investigations. First plan—the blood, placed on a slide, is spread with a knife-blade thinly over the glass, then waving it backward and forward in the air, the blood is dried by evaporation, and can be covered with a thin glass slide, cemented, and kept for a considerable length of time without change. Second plan—a drop of blood is placed on the slide, a thin glass cover is brought in contact with the edge of the drop, and by capillary attraction, a stratum of blood is drawn under it.

Although this answers for immediate examination, unless some menstruum is employed for the preservation of the blood, its characteristics become so completely changed in the process of coagulation that the specimens become useless. In pursuing these investigations, care must be exercised to prevent the *direct contact* of ether and chloroform with the blood corpuscles, as this makes the greatest possible difference.

In conclusion, although it is not my intention in this communication to engage in an extended inquiry relative to how anæsthetics produce their effects, it seems to me that the above experiments demonstrate that we are not warranted in denying that these agents act directly upon the nerve centres. All the phenomena, indeed, attendant upon their administration, the gradual exaltation of the cerebral functions followed by the progressive impairment and temporary suspension of the special senses, the loss of co-ordination on the part of the cerebellum, and when the agent is pushed too far, the arrest of respiration and circulation through the decided impression made upon the medulla oblongata, seem to favor this hypothesis, in contradistinction to the theory that anæsthesia is due to suspension of oxygenation.

In connection with this, I cannot refrain from saying, when taking into consideration the readiness with which fluids absorb gases, that undue prominence apparently has been given by physiologists to the blood corpuscles as *the* carriers of oxygen to the tissues, and carbonic acid gas to the lungs, for it is reasonable *to infer that the liquor sanguinis is actively engaged in this operation.* After the most careful examination under the microscope, I have been unable to observe those modifications in the form of the corpuscles in venous and arterial blood, changing from biconvex to biconcave disks, and attributed to the absorption of the gases, of which so much is said in the books. That anæsthetics, when acting directly upon the nerve centres, may interfere with the oxygenation of the nervous mass, is possible, but it is to be viewed rather as an *effect* than as a *cause* of narcosis. Again, even admitting that such agents as chloroform and ether, by interfering with natural respiration and the oxygenation of the nervous mass, might possibly produce their result in that way, it is difficult to understand how this can be brought to bear upon an agent like nitrous oxide, which contains an excess of oxygen over atmospheric air. To those who may assert that nitrous oxide is a compound (and not a mixture like atmospheric air), and therefore incapable of decomposition and furnishing oxygen to the nervous mass, I would remind them of a law in chemistry, that when two compounds, the elements of which have a stronger affinity for each other than the compounds in which they exist, are brought in contact under favorable circumstances, a mutual decomposition occurs, and new compounds are formed in their place. It may be said that the conditions in the body are not favorable to such results; but who shall have

the temerity to assert that, when recalling the incessant compositions and decompositions of a chemical character taking place in the body, fully recognized and admitted by those who insist most upon the controlling influence of vitality? It is a well-known fact, that nitrous oxide is a supporter of combustion, and that a lighted candle burns with increased brilliancy in it; here the combination of the nitrogen and oxygen in definite proportion is not so strong but that the carbon of the candle is able to seize upon the oxygen, and augment the size of the flame. The function of respiration consists in a mere interchange of gases, of the exhalation of carbonic acid gas and the introduction of oxygen; the latter, absorbed by the blood, is carried to the nervous mass and other tissues, and results in their oxygenation, a slow form of combustion, which is but a difference in degree with the burning of the candle. If, then, the nitrous oxide, as can be readily demonstrated, yields up its oxygen to support the burning of a candle, where is the philosophy in denying that it may also as freely give up its oxygen to a tissue which has such a strong affinity for it as the nervous mass, when they are brought in direct contact with each other?

In addition to these arguments, it should be remembered by the readers of this magazine, that in cases of impending asphyxia from drowning, hanging, inhalation of noxious vapors, etc., on a part of a number of animals experimented upon by my friend and co-laborer, Dr. Geo. J. Ziegler, animation was promptly restored in every case by the injection of nitrous oxide water into the intestines of the animals. In these cases the efficacy of this agent in supplying oxygen to the blood and the nervous mass was most satisfactorily demonstrated.

If we assume that the influence of anæsthetics is dependent not upon a direct action on the nerve centres, but to an altered condition of the blood and the suspension of oxygenation, we must apply the same principle to all diffusible stimulants.

In a forthcoming number of the magazine, I shall present a series of experiments of the results obtained from the *direct contact* of anæsthetics with the different portions of the nervous system.

NECROSIS.

BY THEODORE G. LEWIS, D.D.S.

Read before the Eighth District Dental Society, Buffalo, N. Y.

In this paper I have drawn largely from many standard works, and claim but a small portion as original. The task of compilation and arrangement has more than compensated me for the time consumed; I feel myself much benefited, and certainly have a better understanding of necrosis than before the research.

This word, according to Hooper, "the strict meaning of which is

only mortification, is, by the general consent of surgeons, confined to an affection of the bones."

"The death of parts of bones was not distinguished from caries by the ancients. However, necrosis and caries are essentially different, for, in the first, the affected part of bones is deprived of the vital principle; but this is not the case when it is simply caries. Caries is very analogous to ulceration, while necrosis is exactly similar to mortification of the soft parts."*

In short, caries is an ulceration of the bone, while necrosis is the complete death of a bone.

"Necrosis may take place without the surrounding soft parts being struck with gangrene. It is to the bone what gangrene is to the soft parts. The part of the bone affected with necrosis becomes a foreign body similar to the gangrenous eschar, and its separation must be accomplished by the efforts of nature or by art."†

There are two forms of necrosis upon which the dentist is called to exercise his judgment and skill; necrosis of the alveolus, and necrosis of the teeth, the latter being much more frequent than the former. Throughout this paper I have made a distinction between the two, in the causes, symptoms, and treatment, trusting that I may be able to present them sufficiently clear and distinct, so that no misunderstanding may arise.

Between necrosis of bone and necrosis of teeth there are some points of difference. Necrosis of bone means the entire death of a portion of the bony structure, but in necrosis so developed, there is set up beneath the necrosed portion of bone a new development—that is, a regeneration of the parts destroyed. The dead portion is thus cast off, and new structure appears in its place.

Necrosis of a tooth, while on the one hand it means destruction of the tooth structure, is attended, as a general rule, by no attempt at restoration.

To this general rule one exception, partial in kind, may be adduced. This exception obtains when the external true bony part of the tooth, the cementum, is the seat of necrosis. The cementum being built up and nourished on the same system as ordinary bone, and from an external vascular supply, may undergo partial repair.

That there should be this distinction between the necrosis of bone and the necrosis of tooth, is by no means strange, when the physiological differences of the two structures are understood. The fact is, that every section of bone is supplied with blood from sources which are direct and under pressure from other sources which are indirect. The result, therefore, is, that if one source of blood supply be withdrawn from an existent portion of bone, the parts beneath, owing to the perfect network of blood-vessels throughout all the bone, and the anasto-

* Hooper's Med. Dict.

† Dunglison's Med. Dict.

mosis which everywhere obtains, are supplied with new blood, and new bone is thus produced to displace and occupy the position of that which has been destroyed.

With the tooth this restoration is not provided for. Fed by one artery and one nerve through the pulp, from which the tooth derives its main sustenance, each tooth is an independency. Withdraw the one source of supply, and the organ dies. To illustrate this more fully I copy a simile from Richardson. He says: "To make a simple comparison, bone is as a continent, having communities, many in number, but commercially intimately linked together. If a part of the inhabitants of this continent die, the loss is replaced from without, and that which was desolate to-day is to-morrow refilled with life and activity. A tooth, on the other hand, is an island having no means of independent support, but two rivers of communication with all the world; one a river of supply from the mainland, and another a river back to the mainland. Cut off these communications forever, and the natives of the island, however hardy, must die; the island will be lifeless always."

I have thus placed necrosis of bone and necrosis of tooth in their extreme positions toward each other. We have seen in the above how far any exception to this striking but simple law of separation prevails.

Causes.—If we inquire into the idiopathic form of necrosis, it will be found that it is most common in young strumous subjects having either well-marked evidence of scrofula in other parts of the body, or, at all events, signs of a strumous predisposition. It is in persons of this description more particularly that we so frequently meet with the necrosis of the tibia, femur, and humerus, telling so fearfully upon the constitution, and so often requiring amputation, in order to save the patient's life.

Tertiary syphilis is another cause of necrosis, which frequently terminates in gangrene of the bones of the nose, palate, upper jaw, leg, and arm.

The profuse and daring administration of mercury is, perhaps, the most frequent exciting cause of necrosis of the lower jaw. Fortunately, such cases are becoming every year less common among us, for the bad and unmeaning practice is gradually falling into disuse.

Persons engaged in the manufacture of lucifer matches are liable to necrosis of the jaw, from the probable contact of the fumes of phosphorus with the interior of decayed teeth, and it is not improbable that there are other pursuits which may conduce to destructive inflammation of osseous tissue, although of the precise nature and mode of action we are not informed.

Scurvy has been known to cause necrosis, although more commonly it causes caries. In short, there is reason to believe that necrosis may be induced by whatever has a tendency to bring about an impoverished condition of the blood and solids.

Among the local causes of necrosis may be enumerated wounds, contusions, fractures, amputations, and chemical irritants. Gunshot wounds are a common source of the occurrence.

It will be thus perceived, without going into further details, that death of the osseous tissue may be produced by constitutional or local causes, and that these causes differ in no respect whatever from those which induce mortification of the soft parts

It is often, however, quite difficult to determine the immediate cause of necrosis. In the two cases herein mentioned, it has been impossible to trace the immediate exciting cause of the necrosis of the alveolus; both parties being apparently in good health, and, as far as I am able to ascertain, free from constitutional derangement. The probable remote cause of both cases was external injury. The gentleman became involved in a fracas some two years since, and received a blow on the left side of the face, which was followed, however, by no unpleasant results—except a slight swelling of the cheek—nor, as he remembers, soreness of the teeth. The lady was violently thrown from a carriage some twenty-five years ago, and at the time sustained severe injuries about the face and teeth. The molar teeth on either side were injured to some extent, and remained sore for some time after the accident. One molar, left side, was split and was removed, since which time nothing more than simple caries of the teeth has manifested itself.

In seeking for the causes of necrosis of the teeth, we find them divisible into two; into causes which are external and causes which are internal. The external causes are mainly mechanical, the internal are constitutional. Necrosis of the teeth, from whatever cause produced, is due to a suppression of function in one of two parts, or in two parts simultaneously,—namely, in the vascular pulp, or in the periosteum, or in both. In cases where the pulp and periosteum are equally destroyed, the necrosis is perfect. Where one of the functions remains intact, it is partial necrosis, and with judicious treatment may be made serviceable for many years. Necrosis of a tooth may also be produced by the effects of certain poisons acting through the system. In such instances the poison produces the effects, I should presume, not primarily on the tooth, but on the jaw, and through that on the teeth.

Symptoms.—The symptoms which immediately precede and those which accompany the death of a bone, are generally such as are denotive of violent inflammation, deep seated, attended with excruciating pain, and rapidly tending to the suppurative crisis, the mischief being done in a few days, or even hours.

Necrosis of the alveolus is easily distinguished by the denuded state and whitish appearance of the affected bone—which is always rough, pitted, excavated, or spiculated, and emits when struck with a probe a peculiar hollow sound, readily distinguished from sound bone—and by

the existence of a purulent discharge and the excessively fetid state of the breath; accompanied in all cases by a certain amount of hardness and swelling, with pain and tenderness on pressure.

The indications which attend necrosis are at the outset indistinguishable from the inflammation of the alveolar periosteum, but they differ as the disease advances. Instead of the formation of a local and circumscribed swelling, the gum over the diseased bone becomes generally thickened, tumid, and of a deep red color.*

Necrosis may be partial or complete, simple or complicated, superficial or deep,—that is, it may affect merely a portion of a bone, or it may pervade the entire structure. Instances of the necrosis of the entire lower jaw have been repeatedly noticed; still it is rarely ever that an entire bone is destroyed. Necrosis is sometimes limited to the outer surface of a bone, being merely superficial.

In a necrosed tooth, the result of disease of the periosteum, the tooth may at first be loose, but it need not remain so. It may set up surrounding irritation, and discharge, but this may subside. It may give rise to pain,—and this is perhaps the most characteristic sign. The pain is occasional, is induced by pressure, as in mastication, and is acute,—very acute when it occurs; it is often the result of pressure exerted upon the sensitive nerve entering beneath at the point of the fang. In the cases where the necrosis occurs from destruction of the pulp, the symptoms, at first severe, may cease after the death of the pulp is complete. Pain may then scarcely be felt at all, and the tooth—with proper treatment—may remain for years, affording but little inconvenience.

The changes which the teeth undergo from necrosis are characteristic and well known. In *complete* necrosis the tooth assumes a blackened appearance, resembling jet somewhat in character. There is, however, a wide difference in color, some having a dingy blue appearance, others a dark dirty yellow.

The ordinary view is that teeth in this condition are soft in structure, but this is not an invariable fact, some being brittle and hard.† The ultimate cause of the dark color of the necrosed tooth has been the subject of considerable observation, and should be the subject of a separate paper. I shall not refer to it, leaving it for older and more experienced heads to investigate.

The symptoms attendant on necrosis of a tooth are in the main external rather than central—that is, I mean around the tooth rather than in it.

Treatment.—The treatment of necrosis must of necessity depend very much upon circumstances. There are three indications, according to Gross, which deserve special attention. "The first is to limit and mode-

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* Tomes' Syst. Dent. Surg. † Richardson.

rate the inflammation, which is the immediate cause of the mischief; the second, to watch nature during separation of the old bone, and the formation of the new; and the third, to promote the removal of the diseased bone."*

In case of necrosis of the alveolus the lancet should be freely used on the soft parts, and a *saturated* solution of creasote and iodine should be applied to the necrosed portion once in forty-eight hours.

Crystals of iodine in creasote is comparatively a new remedy, and I believe confined almost exclusively to dental practice. My reasons for using it so exactly coincide with those of the author of "Dental Materia Medica," that I copy the paragraph entire:

"When there is much suppuration from necrosed roots or processes, this is a powerful agent in changing the pus-producing to a plasm-producing surface. It stimulates debilitated parts capable of restoration to health, but destroys such as are too weak to respond to its action. No fungous growth can long resist its continued application."†

A course of iodide of potassium or iodide of iron may be required. It is obvious that no satisfactory progress can be made in any case toward a cure so long as the system is borne down by the pressure of a vitiated state of the solids and fluids.

The third indication is to get rid of the necrosed portion, for so long as this remains it must necessarily keep up inflammation and discharge. There is still a question among surgeons as to the proper time for removal, but generally nature will effect a separation from the healthy part and relieve the operator from a more formidable operation. It is perhaps the better way to defer removing bone until some signs of exfoliation appear. The necrosed bone may be removed with forceps or tweezers, which operation should be conducted in a delicate manner, that none of the bone be crushed and left in. Afterward wash with a syringe and cold water, to clear away any little pieces or fragments. There need be no hesitation in removing a tooth which has caused the disease; but the propriety of at once extracting sound teeth which have become infected by the extension of the disease, may be questioned.‡

In the treatment of necrosed teeth, the first thing necessary is to make an opening to the pulp cavity. This is done by drilling, usually. Remove all devitalized tissue, and treat with creasote. After sufficient time has elapsed to warrant the filling of the nerve canal, this should be done solidly with gold. The tooth is then ready for the bleaching process, which may be proceeded with without fear of unpleasant results.§

It will be seen that the treatment either of necrosed alveolus or necrosed teeth is comparatively quite simple. Above all things, avoid doing *too much.*

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* Gross, vol. ii.

† J. W. White, Dent. Mat. Med., p. 69.

‡ Tomes' Syst. Dent. Sur.

§ James Truman, Dent. Times, vol. ii. 69.

NECROSIS OF A PORTION OF THE LEFT SUPERIOR MAXILLARY.

Case I.—Mr. V. R. W. Smith, aged 40. First indication Sept. 26, 1868. Came to my hands Nov. 13th.

Nov. 13th. Necrosed bone denuded and very firm; second bicuspid gone, having dropped out on the 12th. First bicuspid very loose, and canine quite so; gums much inflamed and swollen, extending nearly to the eye; dull heavy pain; pus discharging freely. Syringed the parts and applied creasote and iodine to the sockets. Administered internally

Syr. Iodine Ferri, ʒij;
Syr. Simplex, ℥iv. M.
Dose. A teaspoonful three times daily.

Nov. 16th. A decided improvement; inflammation subsiding; same application; used the lancet freely on soft parts.

Nov. 19th. Less inflammation; swelling subsiding; scarcely perceptible; some hardness; same application.

Nov. 21st. Removed first bicuspid; canine getting very loose; the left lateral seems a little affected; did not make application.

Nov. 25th. Canine nearly out of the socket. Necrosed portion loosened; resolved on removing. Extracted canine, and removed diseased bone. Syringed the parts.

Dec. 13th. Parts entirely healed.

Case II.—Dec. 7th, 1868. Mrs. A. McA., aged about 60. Came with trouble in socket formerly occupied by second left superior bicuspid. Dr. G. B. Snow had, some three years previous, extracted said tooth, which was badly ulcerated. Found first bicuspid necrosed, and removed the same. A large exostosed fang: a piece of necrosed alveolus came with and was attached to the tooth. Made application of creasote and iodine.

Dec. 9th. Not much improved; same application.

Dec. 11th. Some improvement. Removed a small piece of alveolus. Breath not so fetid.

Dec. 14th. Improving slowly. The socket of first bicuspid nearly healed over. Considerable pus from first molar, which is necrosed. Resolved on removing the tooth.

Jan. 3, 1869. This case suddenly terminated by the decease of the patient by heart disease.

DOES NITROUS OXIDE, WHEN INHALED, FURNISH OXYGEN TO THE BLOOD?

BY A. WESTCOTT, M.D., D.D.S., SYRACUSE, N. Y.

This being an important practical question to the dentist, as well as to those who are to inhale this gas for its anæsthetic effects, I propose to set forth the *chemistry* of this matter through your widely circulated

and able dental journal—the Dental Cosmos. I should hardly have regarded this as an open or unsettled question at this late period, had my attention not been called to a discussion of it, or rather to an *opinion* upon it adverse to my own, by two of our most learned professors in two of our best dental colleges. The gentlemen to whom I allude are Professor McQuillen, of the Philadelphia Dental College, and Professor Buckingham, of the Pennsylvania College of Dental Surgery.

Both of these able gentlemen have taken the ground that nitrous oxide not only furnished oxygen to the blood during its respiration, but that it furnishes it in "*excess*" as compared with atmospheric air, as will be seen in the report of their remarks upon this subject in the proceedings of the Odontographic Society, Sept. 1st, 1868—commencing on page 534 of the Dental Cosmos.

Few are ignorant of the fact that the oxygen of the air is absolutely necessary to support life, and also of the necessity of its being diluted with nitrogen. Now, while the former would prove *too stimulating* (not exhilarating) if breathed in the pure state, the latter would destroy life still sooner, by reason of its possessing no life-supporting quality. But these *mixed* (not chemically combined), as in the atmosphere, in proportion as one of oxygen to three of nitrogen, constitute a medium just fitted for respiration.

The error comes of blending a mere mixture, where each gas retains its own elemental properties, with a chemical combination where both elements are absorbed in a new compound, differing essentially in all its properties from either element. In any mere mixture we may always calculate with certainty the result, on knowing the nature and proportion of each of the constituents. Milk, spirits, or any other article mixed with water does not lose any of its own properties, but is simply diluted. Precisely so is it with the oxygen of the air. It is simply diluted with nitrogen, a gas having, as a simple substance, no active property. But the case stands very different when these elements are combined chemically. By the agency of chemical affinity, the most simple elements may result in the most acrid compounds; and, on the other hand, the most acrid substances form the most harmless and inert compounds. An example of the former we have in the union of oxygen and nitrogen (simply the elements of the air we breathe), which results in nitric acid; and of the latter in the union of sulphuric acid and lime, resulting in that tasteless and harmless substance, plaster of Paris. To illustrate the *entire antagonism* between a compound and its constituents, we can refer to none more striking than that produced by the union of oxygen and hydrogen. While the former is the great and almost the only supporter of combustion, the latter will not support combustion, but is one of the most inflammable of all substances. The resulting compound of the chemical union of these two gases is *water*, a sub-

stance wholly antagonistic in all its properties to both of its elements. Now, it would be just as rational for one to contend, while drinking water or breathing its vapor, that he was drinking or breathing oxygen or hydrogen, as to say that he was breathing oxygen when it was chemically combined with any other substance. The universal law of chemistry is, that whenever any two substances are united by chemical affinity, the properties of both are changed, and the result is a third substance differing from either, and that the elements in such compounds cannot act in their individual capacity till a positive decomposition is effected. And hence the perfect absurdity of supposing that we are breathing oxygen simply because we may be inhaling something containing oxygen as a chemical constituent.

These examples might be multiplied *ad infinitum*, but I shall offer but one other, which will not only illustrate remarkable changes wrought by chemical affinity between *different* substances, but where an equally surprising result is obtained *by combining the same substances simply in "different proportions,"* and I can offer no better example than is seen in these very gases—oxygen and nitrogen—in the different proportions in which they are capable of being united. Bearing in mind the nature and properties of these two gases, as simple substances, or when they are simply *mixed*, as in the atmosphere, let us see what changes are wrought by *chemically* combining them, and in different proportions.

These two gases are capable of being combined in five different proportions:

PROPORTION.					RESULT.
1st.	Oxygen	1,	Nitrogen	1	—Nitrous Oxide—[laughing gas].
2d.	"	2,	"	1	—Nitric Oxide.
3d.	"	3,	"	1	—Hypo-nitrous Acid.
4th.	"	4,	"	1	—Nitrous Acid.
5th.	"	5,	"	1	—Nitric Acid [aqua fortis].

It is not necessary to describe the peculiar qualities of all of these compounds. It is sufficient to say that, while one proportion of oxygen and one of nitrogen, *chemically combined*, form the exhilarating or laughing gas, *two* proportions of oxygen, with the same amount of nitrogen, form the nitric oxide gas, a single inspiration of which would destroy life almost instantly. And *five proportions of oxygen* with one proportion of nitrogen, constitute nitric acid, or aqua fortis—a substance not tolerated by any part of the human system for a single moment.

But if the theory above alluded to be correct, viz., that "the more oxygen a compound contains the more healthful and exhilarating it becomes," then nitric acid, containing five times the relative amount of oxygen that nitrous oxide does, should be five times as healthful and exhilarating as the latter gas!

The upshot of this whole matter is simply this: no man, however good a chemist he may be, can predict the nature of a compound by any study of its elements, much less its effect upon the human system. This is to be done, and only to be done, by actual experiment. The chemist who first discovered that the combination of one equivalent of each of the two gases, oxygen and nitrogen, constitutes the exhilarating gas, was of course entirely familiar with the nature and properties of both of its constituents, and yet he was doubtless not a little surprised to find the resulting compound was of such a character, nor could his surprise have been less when he found simply that by doubling the amount of oxygen, the resulting compound was of a most deadly character, as regards its effects upon the human system.

Now, if I have not misstated chemical facts, I ask if there is, in view of these facts, the first shadow of a reason for supposing that nitrous oxide can furnish one particle of oxygen for purposes of respiration?—or can a person live longer in such an atmosphere (so far as relates to this fact) than he could live under water?

I have confined myself in this article strictly and purely to the question which heads it, but should this hasty paper find favor in your journal, or a place in your pages, I will, hereafter, give its readers my own views upon the relative merits of the three anæsthetics in common use—chloroform, ether, and nitrous oxide gas—together with their chemical composition, and their physiological and pathological effects upon the human system; simply now adding that neither of them, in my judgment, furnishes the least possible amount of oxygen in an available form to support respiration.

EXTRAORDINARY ACTION OF IODIDE OF POTASSIUM.

BY J. L. SUESSEROTT, M.D., D.D.S., CHAMBERSBURG, PA.

The dental surgeon having to treat the fifth pair of nerves, or some of its branches, more frequently than the practitioner of general surgery, I feel disposed to give to the readers of this journal a statement of a remarkable experience that occurred to me within less than six weeks, with the hope that it may be the means of removing anxiety from the mind of some one, or by further investigation of the subject may develop a remedial agent for the cure of that most distressing of maladies, facial neuralgia. This, of course, would have to be on the theory that *similia similibus curantur*.

Case I.—On the 25th of November last, A. H., aged about 25 years, applied to me for relief, because of a troublesome eczema of the face, and also a sense of constriction about the heart, together with dull pain in the joints. Desiring to give him the benefit of an energetic alterative, I prescribed potass. iod. grs. v, hydrarg. bichlor. gr. $\frac{1}{8}$, ter per diem, in

a considerable quantity of rich syrup, after eating. The latter direction was overlooked, and the first dose was taken before going to bed. About two hours after he had swallowed the medicine, I was summoned to his bedside, to find him suffering from nearly all of the poisonous effects of iodine that are mentioned in the books, and some that have either never occurred to other observers, or have never been noted.

Before my arrival he had vomited and purged freely, the entire operation being accompanied by the most violent sneezing; this latter annoyance continued up to the time of my seeing him. His Schneiderian membrane was so greatly irritated that water flowed continuously from his eyes and nose; but the most distressing accompaniment was the excruciating paroxysms of neuralgia and violent constrictions across the frontal sinuses and bridge of the nose.

The prescription had been compounded at the store of our most careful and competent pharmaceutist, but from the time I received the message until I reached the patient, I had fearful misgivings that an error had been made. My mind was soon satisfied, however, that the trouble did not arise from an undue quantity of the bichloride of mercury, and after one or two doses of pulvis ipecac. et opii I was enabled to assure my patient that relief would soon follow. Neuralgic pains throughout the face and head, and *extreme sensitiveness of all the teeth*, continued for about two days. Fully persuaded that this gentleman possessed a peculiar idiosyncrasy that rendered the administration of potass. iod. dangerous, its further use was abandoned.

Case II.—On the 30th of December, I had occasion to prescribe potass. iod. in five-grain doses, three times a day, to Mr. J. L., aged about 45 years. Immediately after the first portion was taken he was attacked in a similar manner to the above patient, with the exception of the purging. The coryza was quite as severe, the sneezing continuing for a couple of hours, and the neuralgia and sensitiveness of the teeth as intense as in the former case. All the symptoms yielded, as in the first instance, to the use of pulv. ipecac. et opii. It will be noticed that this patient did not take hydrarg. bichlor.

Case III.—G. B., aged about 25 years, on the 2d of January, took two or three five-grain doses of potass. iod., at intervals of five or six hours, but its use had to be suspended because of the neuralgia that was induced, together with an erysipelatous inflammation that set in at the inner canthus of the right eye and extended over the frontal sinuses. In his case the symptoms were not as severe as in the others, but it possessed many of the peculiarities in a marked degree.

It might be argued that the drug was not pure, and that the peculiar action was brought about by some deleterious contamination; but this theory cannot be correct, for prescriptions had been filled from the same lot of the salt without any unusual occurrence.

Prof. Stillé, in his valuable work on "Therapeutics and Materia Medica," vol. ii. p. 884, says: "The influence of *iodine* on the *mucous membranes* is marked by coryza and a congested state of the nostrils and pharynx, a feeling of tension over the frontal sinuses, and a red and œdematous state of the conjunctiva and eyelids." And on pp. 887 and 888 he says: "Iodism is most conspicuously manifested by the *alimentary canal.* Digestion is impaired, and the appetite lost; the patient complains of an annoying and even painful sensation in the throat and epigastrium, which ultimately becomes a fixed burning pain in the latter, and a distressing heat and dryness of the former. Watery diarrhœa ensues, with colic, and sometimes salivation, which in some cases may be attributable to the revival of mercury in the system, conjunctivitis, coryza, nasal catarrh, and emaciation."

In all of the above-mentioned cases it will be noticed that the teeth became extremely sensitive; this in my opinion was due to the highly exalted condition of nervous sensibility, and not as might be argued because of the elimination of mercury previously taken by the patient. In this opinion I claim to be correct, for the further reason that ptyalism did not supervene, but on the other hand the troubles took their departure simultaneously, as soon as the medicine had expended its force.

Now, the question arises, why should so many patients be thus affected in so short a space of time? I confess that I am unable to furnish any satisfactory reason, and can only offer the conjecture that there must have been some endemic cause that was particularly active at that time, or the subjects may have been in an unusually impressible condition.

I have been prompted to give this lengthened history of the remarkable action of a much-used and valuable remedial agent, with the hope, as above stated, that anxiety may be removed from the mind of some one, and also with the full knowledge that the earnest votary of science is always more greatly assisted by the narration of facts that have been noticed in actual practice than by the most elaborate theories that can be advanced by those who never venture beyond their "sanctums" for the purpose of gaining information.

MECHANICAL DENTISTRY.

BY J. LITTLEFIELD, BOSTON, MASS.

HAVING seen the announcement of Dr. E. B. Goodall's patent method of securing partial sets of teeth by what he terms "spring plates," I take the liberty to make a very short statement of my own experience in the same direction.

I commenced the practice of dentistry twenty years ago, and pursued it constantly until about three years since. During that period I have

occasionally inserted teeth on partial plates in the above named way, not because I thought it absolutely the best manner, but because under some circumstances I considered it the least of two evils.

My method was simply this: After taking the impression, I made the plaster cast, taking care to preserve the models of the natural teeth; then, after scraping *very slightly* the lingual surface of the teeth I intended to have the plate bear against, I procured the metallic casts and struck up the plate. The next step was to solder on pieces of thick plate or wire around the edges of the plate where it came in contact with the teeth, as a broader bearing was less likely to injure the natural teeth than the knife-like edge of the plate.

After this, the plate was accurately adjusted in the mouth and the metal filed away, until a slight pressure on the centre of the plate would cause it to spring so as to pass over the rounded portion of the teeth, and reaching the receding portion at the neck, would of course expand again, and the lateral pressure would sustain the teeth very nicely.

After commencing to use the rubber base in 1862, I occasionally used rubber in the same way, varying the manipulations to suit the different material.

I cannot say precisely at what date I made the first plate in this manner, but I do know that I had frequently done so previous to the year 1861.

Many other gentlemen have assured me that the practice has been common with them for many years; one in particular, who has attained, and deservedly, a very high standing in the profession, assured me that at least twenty years ago he inserted plates in this manner, and that he has continued the practice more or less frequently to the present time.

Like every other method of substituting artificial for natural dentures, it has some serious disadvantages, and although in some cases where the remaining teeth stand very closely together, leaving no room for a clasp, it may be better to use the spring plate, yet it needs very accurate, and, I may say, very delicate adjustment to prevent its bearing too hard on the teeth and gradually pressing them outward, or being too loosely fitted to keep it motionless, and so wearing upon the neck of the tooth and causing its destruction.

There is one lesson to be learned from this, and that is, that members of the dental profession were very much in the habit of groping along, each in his own way, asking no aid of his fellows, and imparting very little of the knowledge gained by his own experience, thus leaving every one to laboriously work out for himself each item of knowledge. A more free interchange of ideas and a more social feeling among dentists would have saved much of this labor, and I am happy to know that those entering the profession now have great advantages over their predecessors in the aid afforded by dental associations, colleges, and periodicals.

Having retired from the practice of dentistry, with no probability of resuming it, I of course have no further interest in this matter than that arising from my long and pleasant connection with the profession, and a desire that an unjust tax may not be added to its already heavy burdens.

NITROUS OXIDE GAS AS AN ANÆSTHETIC.

BY F. K. CROSBY, D.D.S., BOSTON, MASS.

In the November number of the *American Journal of Dental Science*, "a dentist of long experience and large practice" presents to the profession his ideas concerning the use of nitrous oxide gas as an anæsthetic. In the course of the article statements are made and positions laid down, with an authoritative assurance that is well calculated to nip in the bud all presumptuous attempts at dissent; and it is only the profound conviction that proofs should occasionally accompany assertions in scientific discussion, which leads me to assume the venturesome task of pointing out to our oracular friend the holes in his armor.

The first paragraph is as follows: "After an experience of over two years with this gas, I feel impelled to give to the public the results of my observation. I am often asked the question, 'Does it relieve pain?' I unhesitatingly and emphatically answer, 'No.' Then how is it that operations are performed without the knowledge of the patient? The fact is that the memory is in fault. Most operators desire the friends of the patient to remain in another room, and some make it a rule that an apartment must always intervene between them, so that any screams or struggles may not be overheard. It is not invariable that the patient struggles, and some become so dead—yes, that is the word—that there is a total loss of all voluntary motion, and hence they are quiet."

"The *memory* is at fault." This, being interpreted, signifies that a patient under the influence of an anæsthetic is all the while conscious of the pain of the operation, but is unable to remember it after the anæsthetic effect has passed away, or, concisely, that pain, *per se*, is not abolished. Upon this point let us examine the opinion of a distinguished gentleman, likewise of long experience and large practice—Professor Dalton, in his "Human Physiology," page 399:

"It is therefore a very important point in this connection, that *the sensibility to pain is distinct from the power of ordinary sensation.* This distinction was first fully established by M. Beau, of Paris, who has shown conclusively that the sensibility to pain may be diminished or suspended while ordinary sensation remains. This is often seen in patients who are partially under the influence of ether or chloroform. The etherization may be carried to such an extent that the patient may be quite insensible to the pain of a surgical operation, and yet remain

perfectly conscious, and even capable of feeling the incisions, ligatures, etc., though he does not suffer from them. It not unfrequently happens, also, when opium has been administered for the relief of neuralgia, that the pain is completely abolished by the influence of the drug, while the patient retains completely his consciousness and ordinary sensibility." This language is sufficiently explicit to require no comment.

Our writer must have noticed that patients frequently declare themselves to have been perfectly conscious of every movement made by the operator, but yet to have felt no pain. Will he enlighten us as to that peculiarity of memory which enables it to recall those movements, but not the pain which was occurring at the same time? As to the objections in the latter part of the paragraph, the struggles of the patient, and the loss of voluntary motion—"dead, yes, that is the word"—his long experience must have taught him that struggling is not necessarily an indication of pain. After the influence of the anæsthetic has advanced so far that the cerebellum is to a certain extent obtunded, and co-ordination of motion lost, it were not surprising if the patient should struggle causelessly and aimlessly. This is particularly observable when ether has been administered. Indeed, all the points above urged against nitrous oxide apply with equal force to ether or chloroform; but our author would probably hesitate to counsel the abandonment of anæsthetic agents *in toto* upon these grounds.

We come to the third paragraph of the article. "The patient breathes the gas for a while perhaps quietly; but, as the blood becomes charged with carbonic acid, the demand for air is urgent, the breathing is spasmodic, the eyes protrude or roll fearfully in their sockets, the face is livid, and stertorous breathing commences. The operator, to allay the fears of friends who may be present, calls this 'snoring.' But it is nothing less than stertorous breathing, the same that accompanies apoplexy, and the patient is in a state of asphyxia—as much so as if he had been hanged by the neck until this state of things was produced. This is death—the insensibility produced is *death.*"

A point of doubt here arises as to whether the writer confounds snoring with stertorous breathing, or does actually carry his patients to that stage of anæsthesia which stertorous breathing accompanies. If the first is true, the horrors of the above dramatic passage are considerably modified; if the latter is the case, he habitually assumes a responsibility which not even the largest practice or the longest experience can justify. The distinction between snoring and stertorous breathing is important enough to merit a closer examination. The one is harmless—the other betokens a highly dangerous condition. Snoring arises simply from a relaxed state of the muscles of the palatal region, allowing their vibration. Stertorous breathing takes place in the *larynx*, and indicates that the recurrent laryngeal branch of the

pneumogastric is affected; let the exhibition of the anæsthetic be carried but a little further, and the entire ganglionic portion of the pneumogastric will be paralyzed, and the lungs will cease to act. Snoring is physiological, stertor pathological. If the writer of the article has habitually induced this state of things, his admission in a subsequent paragraph, that he "could strengthen these statements by a description of many individual cases in which most unpleasant results have followed the administration of this gas," is not at all to be wondered at.

The author closes: "It might be said that my patients are rebellious and perverse; that they do not take the choking kindly." The same, metaphorically speaking, may be said of some of his readers.

SYMPTOMS OF TETANUS FROM PRESENCE OF BARBED BROACH.

BY WM. H. HOWARD, D.D.S., PHILADELPHIA.

An interesting and instructive case in which tetanic symptoms were manifested came under my care last July, about the 5th of the month. A lady, 37 years of age (nervo-sanguine temperament), called to consult me in reference to the left superior second molar, which caused her great agony; but she was anxious to preserve the tooth. Upon attempting an examination, I met a difficulty from the trismus, the opening not being more than one inch between the incisors; this spurred me to greater immediate efforts, when I found the tooth giving trouble, with a good-sized gold filling, demanding removal, as signs were present of alveolar abscess, discharging through a fistulous opening between the first and second bicuspids, and on the buccal face of the alveolar ridge, also slight oozing at the free edge of the gum of the second molar. I succeeded after hard work in getting out the filling, and entering the palatine root, giving instant vent to a goodly discharge of laudable pus (about 5 drops), but only partially relieving the suffering, on account of poor light and inaccessibility. I discharged the patient with a prescription of elixir cinchonæ and belladonna, and orders to keep perfectly quiet and return early next morning. She kept her appointment and the treatment was continued. I attempted to learn her general symptoms, which were the following: General dislike for food, nervous weakness, a tingling in the hands and feet, an involuntary tendency to gape, getting rest only by cat-naps, otalgia, stiffness of jaws, and a pricking sensation actually located at the second molar. On attempting to procure a further discharge of pus by passing an explorer through the pulp canals, I met a hard movable spicula, deceiving to the touch at first, but which I soon decided to be a piece of metal. Next came the question how to get it out. I thought of many plans, but at last settled upon the idea of drilling through the apicial foramen by the side of the broach,

thereby enlarging the foramen and loosening the broach. I made a drill of a canal plugger, with as good a spear point as possible, and in half an hour got through the foramen; then twisting some prepared cotton on a roughened explorer, I went after the foreign body, and rotating the explorer each way with the aim of having some fibres entwine the broach or whatever it might be, after two or three attempts (during which time I learned that the drier the cotton the better), I drew from its lodgings a piece of barbed broach $\frac{3}{8}$ of an inch in length, eroded almost to nothing for $\frac{1}{8}$ of an inch at its upper extremity. With this victory I felt sure I had saved my tooth, so I now turned my attention to the abscess and succeeded very happily in about two weeks, stopping the tooth with Hill's composition; and discharging the lady with instructions to continue the systemic treatment with some alteration, and to come and see me in six months. About four months and two weeks have elapsed; on return she has for attention a necrosed tooth demanding extraction, which, upon removal, brings with it a sequestrum, comprising both alveolar walls from the dens sapientiæ to the first bicuspid, necessitating the loss of second bicuspid also. A thorough operation also demanded that some chiseling should be done to remove all the sequestrum. I feel sure that it ran up to the palatine plate of superior maxillæ; there was but slight hemorrhage and as little pain in the entire operation. Ten days have passed, the bone feels flesh-like, and granulations are seen in abundance. I feel that, should a similar case present, I would extract immediately without attempting the salvation, which I fear improbable in all such cases.

ALUMINIUM—ITS PROPERTIES, Etc.

BY GEORGE O. STARR, NEW YORK CITY.

In this short article on an important metal, and one which every day is developing some new thing in regard to its usefulness, it will be my endeavor to give its history, properties, etc., as well as my limited knowledge will allow.

Sir H. Davy, in 1802, first proved that alumina was an oxidized body. Wöhler, in 1828, succeeded in decomposing it, from which he obtained the pure metal, aluminium, being in a gray powder; in 1845, he succeeded in obtaining it in small globules, not larger than the head of a pin, and, after many trials, united some of these. M. Déville, however, met with better success, and, in 1854, first obtained it in the form of ingots. Mr. Monier must have the credit of having first made aluminium in the United States—we believe in July, 1855.

Of the manner and different modes of obtaining aluminium, I shall have but little to say. Wöhler obtained it by heating the chloride of aluminium with potassium, equal volumes, in a porcelain crucible, over a

spirit-lamp; great heat is evolved during the process. After allowing it to cool, it is put in water to dissolve the saline matter. Hydrogen gas is evolved, and a gray powder subsides. This powder, after being washed in cold water, is pure aluminium, and, when rubbed in a mortar, exhibits a metallic lustre. M. Déville used in the place of potassium, sodium. After a time, instead of distilling on the metallic sodium the chloride of aluminium, he used the double chloride of aluminium and sodium, the metallic sodium, the fluoride of calcium, and some cryolite. Mr. Monier made the double chloride, with chloride of sodium mixed with alumina and coal, and passed over this (ignited) the dry chlorine gas. M. Chapelle, in 1854, produced it by introducing pulverized clay, sea-salt, and powdered charcoal into a common crucible, and heating in a reverberatory furnace. When the crucible was cold, a quantity of small globules of aluminium was found at the bottom Of these processes, no doubt that employed by M. Déville is the best, as he has met with the most success. Its specific gravity is 2·6, just $\frac{1}{7}$ of the specific gravity of gold, $\frac{1}{4}$ of that of silver, and $\frac{1}{8}$ of that of platinum. In regard to its malleability, M. Degrousse, a gold-beater of Paris, formed very thin plates or leaves of this metal, as thin as those obtained by beating gold or silver, the beating being done in the same manner, although it is frequently necessary to temper it, very slight heat being used. In hardness, it resembles silver, after it has been melted, and it almost resembles the hardness of soft iron, after it has been hammered. After being hammered, it becomes rigid and elastic, emitting the sound of steel when struck against a hard substance. It fuses or melts at a lower temperature than silver, and a higher one than zinc. Aluminium does not oxidize, even at a strong heat—a property which it possesses to a greater degree than any other metal. It decomposes water slowly at a white heat. It is not attacked by sulphuretted hydrogen or sulphide of ammonia, and consequently preserves its lustre where silver or iron corrodes or blackens; neither does sulphuric or nitric acids affect it when cold, and but slowly when warm. Hydrochloric acid dissolves it. Ammonia acts on it but slightly. Its sonorous qualities make it useful in musical instruments. MM. De la Chaussé and Moure, of Paris, made a helmet which weighed about one and one-fifth pounds. The *Chemical News*, of London, says that MM. Collot Frères made a chemical balance entirely of aluminium, and that M. Rogers, the celebrated tenor, who, by an accident while shooting lost an arm, had an artificial arm made of aluminium, by M. Mathieu, so perfect that, upon his *entrée* at the opera before an enthusiastic audience, with the best opera-glass, it was no easy matter to distinguish between the natural arm and its artificial member. When Wöhler first extracted aluminium in small globules, he little thought that it was to play such a part upon the stage. Among others who have spent much time experi-

menting upon the uses and applications of aluminium, I must not forget to mention the celebrated physician and chemist, Prof. Saml. R. Percy, of the City of New York. Another thing which is apt to make this metal more valuable, is its use in dentistry. Not long ago, Dr. J. Bean, of Baltimore, obtained a patent for cast aluminium plates for artificial teeth. This, however, is a very difficult and expensive process, requiring great care and time. Since then, Dr. Alfred Starr, of New York City, has received two letters patent for aluminium solders for uniting it to other metals and itself. By his valuable discovery, it can be worked in dentistry as easily as gold or silver, and in much less time. There can be no doubt of its value in dentistry, combining as it does tastelessness, low specific gravity, tenacity, and durability. There are many other things to which it may be applied with great success, and time will show that this long-neglected metal will prove of great usefulness, value, and importance.

PARTIAL SETS OF TEETH.

BY J. A. PERKINS, D.D.S., AMESBURY, MASS.

We do not propose to go into any lengthy discussion of the relative value of partial sets of teeth. That they are often necessary to assist in mastication, and are essential to good looks, none will deny, and if the profession would pay more attention to their proper construction, they would be more generally worn, and all concerned would be better pleased with the result. But the majority of dentists seem to believe in the "wholesale" removal of teeth.

To this we are opposed, and repeat that we think too little attention is paid to the department of dentistry we have under consideration.

For example: not long since a young clergyman called on us with a very sound upper set of teeth, with the exception of the two laterals and second molar on the left side, which he had lost. He remarked that he had already worn two plates, and the one with the two teeth attached, which he presented, was in a pitiable condition, and very poorly formed. The plate was made as usual, and after the *manner described in the books;* cut so as to fit round the posterior part of every tooth it passed, thus crowding the gum away and producing inflammation.

The two clasps, consisting of one thickness of plate, were attached directly to the plate, pressing on and into the gums surrounding the right and left bicuspids, making them anything but pleasant to the wearer.

The plate we furnished him was a little over a quarter of an inch wide in some places, and extending over and resting on the jaw a little posterior to the left wisdom tooth, thus assisting in holding the teeth

and plate in position. It may be made of gold or silver. We generally strengthen the plate by soldering a narrow strip nearly its entire length. The clasp was made by uniting two pieces of plate together, and having it pass as near the crown of the tooth as possible, quite wide, but not low enough to touch the gum. The clasp thus fitted to the left molar tooth, filled and burnished, and united to the plate by a standard of sufficient strength to make it secure, would spring on and off the tooth with perfect ease, and still not drop down at any time. This partial set of teeth gives perfect satisfaction. The above case is not a solitary one, for we see very many of them. If the eye teeth are to be clasped, the clasp should go but little more than half way round the tooth, and in no case must the *plate or clasp be seen or interfere with the gum surrounding the teeth.*

The common method employed, suction, covering the roof of the mouth, is perhaps the best, but it takes up so much room that it will not at all times give satisfaction, as in the example referred to.

AN OBSTINATE CASE OF HEMORRHAGE AFTER THE EXTRACTION OF A TOOTH.

BY R. M'KISSICK, PENNINGTONVILLE, PA.

A GENTLEMAN in delicate health requested me to call at his residence and extract a tooth from which he had been suffering very much for some days. I found a severe case of periodontitis of the left inferior wisdom tooth, the side of the face and neck considerably swollen, and the jaws rigid. The tooth was extracted with but little difficulty; the bleeding was profuse, but not more so than generally follows the extraction of a tooth when similarly affected. It soon subsided.

On the evening of the fifth day after the tooth had been extracted, bleeding commenced, and continued very much until next morning, when I was notified of the fact. The hemorrhage was easily arrested by plugging the cavity tightly with cotton, well covered with ferri subsulphatis (Monsel's salt). On the morning of the following day the hemorrhage recommenced; upon examining, I found the blood was oozing from the gums opposite the second molar, buccal surface. The parts were well seared with nitrate of silver, which arrested the bleeding at the time.

The following day, one week from the time the tooth had been extracted, bleeding commenced again, but still further forward, opposite the first molar and second bicuspid. Nitrate of silver was again applied, with the desired effect; a thick roll of cotton lint, well covered with tannin, was placed upon the gum to extend as far front as the incisor teeth, and a piece of muslin folded tightly and placed in the mouth, so that when the jaws were closed it would produce considerable pressure upon the gums. On the outside opposite the bleeding point a strong pulse could be distinctly felt.

Ice was directed to be applied externally, the patient to remain as quiet as possible in a sitting posture for some time. No further hemorrhage occurred.

PROFUSE HEMORRHAGE.

BY L. E. DISNEY, COSHOCTON, OHIO.

About 2 o'clock P.M., on the 8th of July last, Miss P., a lady aged 18 or 20 years, of sanguino-bilious temperament, came to our office to have her mouth prepared for an upper denture. When she left the office, after the removal of the teeth, there was very slight hemorrhage observable. But in the evening the blood began to flow quite freely, and up to two o'clock in the morning the patient thought she had lost half a gallon of blood.* At this hour I was sent for, and found the patient with paroxysms of nausea, accompanied by profuse and clammy perspiration, attended with chilliness and cold extremities. Her mouth was full of blood, and she supposed it issued from all her gums. But an examination proved it to come from the alveolus of the first right superior bicuspid. A pledget of cotton saturated with sulphuric ether, then rolled in tannic acid, and forced into the socket, completely checked the bleeding. In perhaps fifteen minutes the pledget was removed, and another, prepared in like manner, immediately inserted with a compress of cotton for the lower teeth to press upon. I then left her, with instructions to keep quiet, and sleep, if possible. Near eight o'clock in the morning I called again. She had bled no more, had slept quite pleasantly, felt very much better, and intended to start in a few hours for her home, ten or twelve miles in the country.

FILLING OVER EXPOSED PULPS.

BY GEO. B. SANFORD, D.D.S., CHICAGO, ILL.

Thinking that each one's mite is or may be beneficial to the profession, I send mine. My plan is to cut a slice of fine cork, large enough to cover the exposed pulp and thin dentine; place it in position, and fill without pressure on the cork and pulp, but so as to leave no part of the cavity unfilled. I have had quite as good success in this way, when the pulps have not been much exposed or diseased, as by devitalizing them, and consider cork the best material for the purpose.

* The statements of a patient under such circumstances should be received with much allowance. It is not probable that the quantity of blood named could be lost without inducing syncope, and weakening the patient so much as to be unfit to bear the fatigue of traveling even a few miles on the following day. The blood and *saliva* flowing from the mouth may have approximated to half a gallon. J. H. McQ.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

A SPECIAL meeting of the Society was held at the Philadelphia Dental College, No. 108 North 10th Street, on Monday, Feb. 1st, 1869.

The President, Prof. McQuillen, introduced Prof. F. G. Lemercier, M.D., of the Polytechnic Association of Paris, to the members of the Society and students of the college. This gentleman is well known from his connection with the famous Dr. Auzoux, of Paris, whose clastic* models, so justly celebrated for their ingenuity of construction and perfection of detail, should be used in every institution where instruction in anatomy or physiology is attempted.

After a few introductory remarks, in which he congratulated the students upon the opportunity afforded them to become masters of the anatomy and physiology of man, as illustrated by the subject, in the various preparations and specimens of the museum, he called their attention especially to the cabinet of clastic models, by means of which the course of lectures, from being but imperfectly illustrated by drawings, etc., was made of more than ordinary interest, from the facility and precision with which the studies presented in man and the lower animals are demonstrated from the very wonderful and perfect models which it contained. So rare is this selection, that it is the only one in this city that is so complete, and, so far as known, but one other of the kind has been imported into this country.

"The Nervous System" was announced by Dr. Lemercier as the subject chosen by him for consideration; and, without following the explanations of this gentleman, it may be remarked, that aside from the intrinsic value of the lecture, it was an evidence of how the command of such materials for demonstration enables one to hold the attention of an audience to a subject which is almost a *pons asinorum* for those who are masters of the language. When to the usual difficulties is added that of thinking and expressing one's self in a foreign tongue on such an abstruse subject, beset as it is with all the various technicalities that are necessarily used, it may be accepted as an evidence of the powerful auxiliaries these preparations are, appealing as they do to the eye by both form and color, and to the general sense by solidity and texture, thus becoming almost prompting notes for the lecturer.

To illustrate the fibrous connecting filaments in the brain, a model was used which gave the appearance of the more recent preparations from the human subject when dried by chromic acid, in order to harden

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* Clastic—"From Κλάω (Klao), to separate; anatomical preparations composed of solid pieces, which can be easily taken apart and put together one by one, thus being like actual dissections."

and admit of the dissections, to show these connecting threads of the major ganglions of nervous matter; these being very plain in the most perfect form of the complete organism, which he gradually built up, as it were, before his audience, from the typical nervous systems of the lower animals, all of which three, together with two of man, were taken from the cases in the room.

The lecture being closed, clastic models of the structures of the human hand, twice the natural size; the head, poison fangs, and ducts of the viper, magnified; an enlarged representation of the human larynx, one foot long, showing the parts used in the mechanism of the voice; thirty *fac-similes* of the dentition of the horse, showing the changes that take place at different ages in this animal, were exhibited.

Any remarks upon these preparations would be superfluous, since they have been so long known to the scientific world as the most perfect of their kind.

The gratification of the members was happily expressed in a vote of thanks, which was unanimously carried, and the Society then adjourned.

A regular meeting was held in the usual place, on Wednesday, Feb. 3d, 1869. The President in the chair.

Mr. Coleman Sellers, of Philadelphia, having been introduced, exhibited a contrivance for grinding down and polishing thin sections of hard substances, which he said he had been using for some time, in preparing specimens of teeth, minerals, etc. for microscopic examination.

It was a modification of a machine originally invented by Mr. Bancroft, and in use in this city in the factory of Wm. Sellers & Co.

Mr. Whitworth, of England, had devised a machine for making plane surfaces on soft metals, but this operated upon a different plan and was useless when applied to the purposes for which Mr. Bancroft had designed his apparatus. It consists of an emery wheel, which is arranged to revolve at a high rate of speed, the edge projects through a circular opening in a plane table, which latter is capable of being raised or lowered by a screw adjustment, and serves as a rest upon which to support the object to be ground, enabling the mechanic to cut a true plane surface, or by turning the other side of the substance, it may be reduced to a uniform thickness. So delicate is the operation of this apparently simple and beautiful machine, that two surfaces of hardened steel can be made so true with unskilled labor, aided by this means, as to cohere. The original theory, that the atmospheric pressure held them together, has been disproved by placing delicate filaments of silk between the plates thus prepared, permitting the air to enter and yet allowing the two pieces to come so nearly in contact as to be subject to the influence of the attraction of cohesion.

He explained his method of mounting sections as follows: having first

cut the substance into thin slabs, by means of a circular saw, one of which was mounted upon the same spindle as the emery wheel, he ground one side smooth by pressing it with his finger against the side of the emery wheel; this is then finished on Scotch stone and polished on a piece of plate-glass. By means of a drop of Canada balsam, the prepared side is attached to the glass slide and dried over a spirit-lamp until it is firmly set. The only rough side being now exposed, is ground down and polished in the same way; the thickness of the specimen can be measured by a delicate pair of calipers, also shown, which with a screw adjustment and Vernier will measure the one-thousandth of an inch. Slides with specimens, the one five-hundredth of an inch thick, prepared in this way, were exhibited.

The circular saw was centred by an ingenious contrivance, mentioned in the *Scientific American*, of a small cone on the mandrel, with two washers, one on either side, in which were concavities to admit the cone and a spiral spring to press it into the hole in the centre of the saw; the whole being held in position by screw clamps similar to those ordinarily used for holding the dentist's corundum wheels.

A vote of thanks to Mr. Sellers was unanimously passed by the Society.

Mr. Levi Stuck, of Ohio, described a method of making metallic dies from plaster impressions. Lead or bismuth may be used, but he prefers the purest block tin. The process for vulcanite work he offered for inspection. The plaster impression has a little vent or slit cut in it, corresponding to the mesian line of the mouth, from the part where the air-chamber is placed to the back of the plate, and into this run smaller openings of the $\frac{1}{8}$th or $\frac{1}{16}$th of an inch in length. The cutting is performed by carefully drawing backward on the plaster a delicate saw made of a watch-spring. The impression, thus prepared, is dried by being heated up to 212°, and while yet warm the molten metal is poured into it.

The trial plate is made by burnishing sheet tin, a little thicker than it is proposed to make the plate, upon the die; it shows upon both sides the rugæ of the mouth, and is of a uniform thickness. The teeth mounted as usual upon the trial plate, by wax over the backs, pins, etc. After being fitted in the mouth, the case is placed in the flask, upon the tin die, and the plaster mould for the work is made in the ordinary manner. The latter being prepared with gates to the upper part, or that which comes in contact with the lingual surface of the plate, is covered with very thin sheet tin, and the work of packing and vulcanizing completed as usual.

It is claimed that, by making a plate of uniform thickness, a greater amount of elasticity or pliability of the case is secured than by the present style of work; also that alterations in the plate, if desirable, can be made after vulcanizing by warming and pressing it again upon the metallic die. A saving of both time and labor is also asserted to be in its

favor; as the plate requires but little polishing, coming out in the main smooth from the vulcanizing flask.

For making heavy dies between which to swage metallic plates, a collar of thin sheet iron may be used around the impression. He found the only tin that he could use with advantage was purified by John G. Crook, of New York.

Upon being asked for the views of the members of the profession, with regard to vulcanite in the State from which he came, he stated that he could not give it as authority, but was of the opinion that nine-tenths of the plate work was in rubber. This he thought was due to the fact that, for country practice, it was so readily and cheaply constructed.

Dr. Harris taking the floor, said that he felt that the great objection to vulcanite base was that its cheapness encouraged the sacrifice of the natural organs, for the purpose of substituting artificial dentures; but as the subject for the evening's discussion was the "Indiscriminate Extraction of Teeth," he would defer further remarks on this subject for the present.

The Curator then exhibited a cup for facilitating the taking of plaster impressions of the mouth when some of the teeth were retained by the patient. This cup, he said, was made by Mr. A. J. Snead, of Virginia, one of the matriculants of the Philadelphia Dental College, and was certainly a well-contrived affair, admitting of removal by sections, which were held together by pins, so that the plaster could be readily broken out from the mouth and readjusted.

The same gentleman then brought to notice a tongue and cheek holder, the invention of Mr. Jos. Holmes, of Ohio, also a matriculant of the college. This was a more complicated instrument, with various adjustments to hold the tongue, lips, cheeks and inferior maxilla in certain positions, independent of any act of the patient's will.

In conclusion, Dr. Nones said he could not help congratulating the faculty of the college on the number and talent of the members of the present class—the latter particularly, as seen in the different instruments made by them.

The President expressed his satisfaction, and felt that it must be the sentiment of the Society, in having had an opportunity to examine the varions apparatuses exhibited. He took occasion to remark that the Odontographic Society was formed with a view of inviting contributions from all parts of the world, of descriptions of machines, inventions, essays or any matters of interest to the dental profession.

Dr. Harris had used a tongue holder in his practice; as he always liked to cross a stream dry shod, and doubted the advantages claimed for the hydraulic operations with any of the present materials for filling teeth.

It was then moved and carried that these gentlemen, whose instruments were exhibited, were hereby requested to furnish written descriptions of them, for publication in the journal of the proceedings of the Society.

BIOLOGICAL AND MICROSCOPICAL DEPARTMENT OF THE ACADEMY OF NATURAL SCIENCES.

A few months since a brief notice of the reorganization of this department of the Academy was published in the Dental Cosmos. Since that time it has been actively engaged in prosecuting the objects for which it was formed. The meetings have been regularly and well attended, and a decided impulse has been given to microscopical investigation in our city. In the report of the proceedings of the department, made by Dr. Jas. Tyson, the Recorder to the Academy, he says:

Although so recently revived, quite a number of valuable contributions have been made by our members, on subjects of microscopical and biological interest. The principal ones contributed were verbal communications on Interglobular Spaces in Dentine, illustrated by a number of microscopical specimens, by J. H. McQuillen, M.D.; verbal contribution on the Glandular Apparatus of Drosera Rotundifolia, by J. G. Hunt, M.D.; verbal communication on Certain New Glands in the Nepenthis distillatoidea, by J. G. Hunt, M.D.; description of a New Form of Section Cutter, by J. G. Hunt, M.D.; a paper on the Action of Phosphorus in Poisonous Quantities on the Animal Economy, illustrated by microscopical preparations, by Wm. Pepper, M.D.; verbal communication on Wolffia Columbiana var. Philadelphica, by Jos. Leidy, M.D.; verbal communication on the Action of Nitrous Oxide Gas, illustrated by administration to a number of lower animals before the department, by J. H. McQuillen, M.D.; verbal communication on the Action of Anæsthetics, Ether, Chloroform, and Nitrous Oxide, on the Blood Corpuscles of Man and Animals, illustrated by microscopical specimens of their blood corpuscles, by J. H. McQuillen, M.D.; verbal communication on the Pheronema Annæ, by Jos. Leidy, M.D.; verbal communication on Euglena Viridis, by Jos. Leidy, M.D.; verbal communication on Reproduction in Schizomeris, by H. C. Wood, Jr., M D.; verbal communication on Chantransia chalybea, by H. C. Wood, Jr., M.D.; verbal communication on Palmella Jessini, by H. C. Wood, Jr., M.D.; verbal communication on the Action of Serpent Venom, by S. W. Mitchell, M.D.; verbal communication on the Use of Glycerin Jelly for Mounting Vegetable and Animal Tissues, by W. H. Walmsley.

The cabinet of the department has been thoroughly examined, worthless specimens removed, those of value cleaned, remounted, properly arranged, and classified. Quite a number of additions have been made through donations of Dr. F. M. Lewis, and Messrs. T. W. Starr and W. H. Walmsley, members of the department.

The collection of instruments has been increased by the purchase of a clinical stand and two objectives, a fifth and eight-tenth; and a donation of a Powell & Lealand stand, by Dr. F. W. Lewis, with a set of lenses, including an inch and a half, an eighth, and a one-twelfth, all capable of being placed in good condition.

The department numbers at present ninety-one resident members and thirteen correspondents, a full proportion of the former attending the stated meetings.

CHICAGO MICROSCOPICAL CLUB.

STRUCTURE OF THE BLOOD CORPUSCLES.

At the regular meeting of the Chicago Microscopical Club, held a the Academy of Sciences, January 26th, W. W. Allport, D.D.S., was elected President; James Haukey, Vice-President; Henry F. Monroe, Esq., Secretary, and George M. Higginson, Esq., Treasurer.

An adjourned meeting was subsequently held at Rush Medical College, by invitation of Prof. J. W. Freer, to witness his exposition of the anatomy of the blood cells.

The President, Dr. Allport, in stating the object of the meeting, said that the existence of nuclei in human blood corpuscles had been long a question with histologists. Such distinguished men as Drs. Carpenter, Dalton, Peasley, Wharton, Jones, Kölliker, Bennett, Beale, and McDonald, have denied their existence. Virchow is the only author who has strongly inclined to the opinion of their existence, and he simply assumes the fact without clearly demonstrating it.

Within the last twelve months, Prof. Freer, of this city, has discovered in these corpuscles characters which have never before been mentioned by any author on human histology. In his recent visit to Europe he exhibited their structure to Prof. Hughes Bennett, of Edinburgh, who subsequently stated to a physician of this city that Prof. Freer had presented to him characters in the blood cells which he had never before witnessed. Other prominent European histologists made the same frank acknowledgment.

If what Dr. Freer shall exhibit should prove to be the real nuclei of the blood cells, it will be sufficient to hand his name down in the history of medicine as the discoverer of what has long been sought, but never before found, and will entitle him to the gratitude of all lovers of science.

Prof. Freer, in presenting the subject of the evening, said that histologists acknowledge the existence of a nucleus in the reptilian blood cells. He had always believed the blood cells of warm-blooded animals nucleated, also. When viewed by transmitted light, the structure is lost, and it is only when shown by reflected light as an opaque object—which he was able to do by the use of an illuminator invented and patented by Professor H. L. Smith, of Geneva, N. Y.—that the anatomical structure of the cell is truly exhibited. This shows the cell as a bi-concave disk with the nucleus appearing as a prominence in the centre. He did not make this as a positive assertion, but exhibited the object, and left scientific men to draw their own inferences.

Dr. S. J. Jones stated that he saw Professor Bennett subsequently to his meeting with Professor Freer, and that Professor Bennett expressed his high satisfaction with the presentation of the cells which Professor Freer made.

The club then proceeded to inspect the corpuscles, and subsequently other interesting preparations made by Dr. W. C. Hunt.

After a brief discussion of the points presented, and the adoption of a vote of thanks to Professor Freer and Dr. Hunt for the gratification received, the club adjourned.

VOTE OF THANKS.

At the close of the last meeting of Dr. E. R. Pettit's quiz class, of the Pennsylvania College of Dental Surgery, a resolution of special thanks was unanimously passed for his earnest efforts to advance the interests of his class.

EDITORIAL.

MECHANICAL DENTISTRY.

In this connection there have appeared, in several recent numbers of the Dental Cosmos, communications in reference to methods and improvements which were avowedly for the purpose of furthering proprietary interests, but which seemed nevertheless to be of importance to the profession at large.

These communications were admitted contrary to our custom, from a desire to give our readers an opportunity to judge for themselves of the merits of the respective claims. In this number there are replies to two of the said articles, the admission of which seemed proper for the same reason. J. H. McQ.

BIBLIOGRAPHICAL.

Transactions of the Odontological Society of Great Britain. Vol. V., 1865–66–67. London: Published by the Society. 1867.

A handsome volume of some 405 pages has been received from this organization, embracing the proceedings of the society during the years 1865–66–67, presenting a number of valuable papers, among which we observe the following: "Fang Filling," by Thos. A. Rogers; "A New Method of Producing Local Anæsthesia," by Dr. B. Ward Richardson; "Upon the Fossil Teeth of Fishes and the Palæozoics and Lower Members of the Mesozoic Rocks," by Mr. Ibbetson; "The Best Form and Arrangement of Artificial Teeth for Mastication," by Mr. Balkwill; "On the Dentition of the Mole," by C. Spence Bate; and on "Dental Nomen-

clature," by Mr. Bridgeman, in the opening of which he remarks: "The phraseology and language of any science is generally held to be one of the best indications of the position of that science in the scale of advancement; but if this test be applied to our own specialty, dental surgery, I fear, would scarcely take that position to which, in other respects, it is fairly entitled. It is true, however, that some progress has been made within the last few years, and that a number of terms have been introduced, some of which are quite in accordance with our claim of scientific rank; yet we are deficient in that nucleus or systematic code around which those terms should centre, and with which they should harmonize and amalgamate. For this systematic framework or basis, upon which the elements of superstructure should gravitate, we should have recourse to the elements themselves. We must make the anatomy of the denture furnish us with the nucleus of centralization." Taking this as a basis, Mr. Bridgeman presents a very interesting paper, accompanied with a number of illustrations. The adoption or recognition of the terms which he proposes, of course rests with the profession. The concluding paper of the volume is by Prof. Owen, F.R.S., on the "Dental Characters of Genera and Species, chiefly of Fishes from the Low Main Seam and Shales of Coals, Northumberland." A paper presented under this head is selected by the Professor from a supplementary MS. chapter of a second edition of his "Odontography," some materials not yet made public. He says: "I feel pleasure in this opportunity of co-operating, with the practical members of the society, in their purely scientific aims, to establish their most useful branch of surgery on the broad basis of Hunterian physiological principles, as deduced from a survey of the modifications of a dental structure and phenomena throughout the animal kingdom. The present contribution is but a small one, but the thought that 'every little helps' encourages me to offer it; and the facts are afforded by a part of the great vertebrate series most remote from that in which the society is practically concerned; moreover, the descriptions from which my description and illustrations are derived, have long since passed away from the theatre of my existence. I have, therefore, to bespeak the indulgence and favor of my auditory."

The article is presented in that clear, concise, and comprehensive manner which has ever characterized the productions of this eminent anatomist, and the illustrations accompanying it, many of which are colored, are not only very beautiful, but will prove of great value to the student of comparative anatomy. The illustrations throughout the work are well executed, and the general character of the Transactions, in a literary and scientific point of view, combined with the mechanical execution of the work, the typography, binding, etc., reflect much credit upon the Odontological Society. J. H. McQ.

OBITUARY.

At a meeting of dentists held at the Mott Library, New York, Jan. 13, 1869, the occasion being the death of Dr. A. W. Allen, Dr. J. G. Ambler was called to the Chair, and Dr. W. C. Horne was appointed Secretary.

Appropriate remarks were made by Drs. Ambler, Northrup, and Atkinson, and, on motion, a committee of three was appointed, consisting of Drs. J. G. Ambler, A. L. Northrup, and W. C. Horne, to prepare suitable resolutions, expressive of the sympathy of the meeting with the family of the deceased, and to publish them in such journals as they should deem proper.

The committee subsequently reported the following resolutions, which were adopted:

Whereas, We have heard with deep regret of the sudden death of Dr. A. W. Allen, dentist, of this city, taken away in the midst of a life of usefulness; therefore

Resolved, That we bear testimony to the high regard in which we held the deceased as a professional man and as a Christian gentleman; one who, in all the walks of life, was actuated by the desire to be good and to do good; and who in his honorable calling earned the esteem of his patients and of us his fellows, for his ability and faithfulness.

Resolved, That we tender to the widow of our departed friend, and to his beloved brother, Dr. W. H. Allen, the assurance of our sorrowful sympathy in their great affliction. W. C. Horne, *Secretary.*

CORRESPONDENCE.

ROSE PEARL AND THE WESTERN NEW YORK DENTAL ASSOCIATION.

To the Editor of the Dental Cosmos:

A communication in the February number of the Dental Cosmos, signed by J. A. McClelland, calling in question the "truth and honesty" of the report of a committee of the Western New York Dental Association, on "Rose Pearl," requires a few words in reply.

The committee reaffirm all the statements in that report.

Dr. McClelland did affirm at the meeting of the Buffalo Dental Society—and that affirmation did procure for him the majority of his class—that "the fit and adhesion were more perfect with Rose Pearl than with any other substance as a base." The committee said that pledge remained unredeemed. They say so still.

The doctor did make, with his own hands, even to taking the impression, both of the pieces described in the report, with the exception merely, in the second set, of arranging the teeth upon the model. Both pieces were kept in the evaporator till pronounced by himself finished.

The last one had a second application of body applied in front, and was again exposed in the evaporator for the full time directed by the doctor, making considerably more than forty-eight hours in all. The committee do not believe that twice that time will expel all the ether from a thick piece.

No. 2, after having been exposed, as above stated, more than the time prescribed, and having laid since quietly in the drawer six months without even once "warping out," is still redolent of ether when punctured with a drill.

The piece made for Dr. Whitcomb, also, was designed for a patient, he doing some parts of the work under the doctor's supervision, and Dr. McClelland himself went over to fit the piece into the patient's mouth, and there pronounced it all right.

It was worn long enough to make a rubber set instead. So of the other pieces. All were intended to be worn. All were made by his own hands, or under his immediate directions; and for mouths most of which were there present.

If it were possible for him to insure success by more pains, is it credible that he would not take such pains, when his own credit and pecuniary interests were at stake?

The doctor talks about *initiatory* lessons. He took pay for *teaching* the art. He did say, if he had but one student, he could only give an initiatory lesson, but that if half a dozen were procured, he would stay a week or ten days and finish up a piece for each one. This he did, and the committee make no complaint in this respect.

True, the doctor talked a great deal about the difficulty of the manipulations, the necessity of trying and trying again, and to continue experimenting till the work did come right. Had there been failure in manipulation, this would have been good sense. The committee did not find the difficulty there: any live student can master that; but they did find that no set can be dried over a model without changing shape more or less.

There is one other point we must notice here. None of the pieces fitted *well* at first. The doctor wished to quiet our fears by the assertion that they would improve in this respect by wearing. Our experience proved the reverse. Even the piece made for Dr. Harvey, the only one he is willing to own, when presented to the society with the model, had a decided rock, and required considerable force to press it fairly down on the model.

The doctor's New Jersey correspondent has found the "trouble"—which he says the doctor knows—"to fit the plate to the mouth so as not to wound the mucous membrane by the plate edges." This arises from warping, doubtless, the edge in some places being turned in so as to cut a gash and make a bed for itself. We have seen the same thing with bad fitting metal plates.

As a sample of the doctor's accuracy in statements, he says that the piece "No. 2 was fully three-eighths of an inch thick over the cuspidati when taken from the evaporator." Nothing has been removed since, except slightly to smooth the surface, and now, on cutting down to the fang over one of the cuspidati, the whole thickness measures less than one-eighth of an inch. Over the other a full sixteenth is all the covering it has.

What has become of the missing quarter of an inch of integument over these cuspidati? Has it evaporated?

We mention this merely to show that our careful statement of facts may be as reliable as the careless recollections of our accuser.

The doctor complains that six gentlemen signed the report, while he taught but five of the number. Perhaps this is the main point, after all, in the docter's defense of "truth and science," on which he bases his charge against the committee of "falsifying truth and honesty."

The facts are these: Two of the committee are partners, and the doctor had very generously, not to say properly, consented to accept but one fee for the whole office right. Both the doctors attended, saw all that was to be seen, and heard all that was said, whenever they chose to be present.

The committee hope this explanation will satisfy the doctor on this point, and exonerate the Western New York Dental Society for appointing one more committee man than he thinks they were entitled to.

To be obliged to report adversely on the results of honest effort to excel in anything, is always an ungracious task. The committee felt this, and hoped to discharge their duty simply by showing Dr. McClelland's own work. In doing this, they omitted in their published report several important features, which may as well be supplied here.

One is, the cavities which are always left around the fangs by shrinking away of material. If but one tooth was surrounded, it would be hugged closely on all sides; but when two or more stand in line, as in the arch, the material between the fangs always shrinks one-half in bulk, leaving a space in all such situations, by the side of one fang or both, which becomes a receptacle for secretions and filth. In this respect rubber is far preferable. On being *thoroughly* dried, also, seams or spongy interstices become apparent between the scales of which it was made up; these become filled in like manner by colored matter, showing imperfections after being worn which had not before been developed, effectually destroying the attractive appearance of new and clean hand-specimens.

For these reasons gum teeth cannot be used, as the material will not hug in shrinking to a flat or concave surface. In using Rose Pearl, therefore, the material itself has to represent the gum. Will it do this? At first sight, in looking at clean hand-specimens, dentists are apt to

think it will do. But when compared by the side of porcelain gum, it becomes a dead, opaque, painted surface, and when placed in the mouth these defects are far more apparent. Aside, therefore, from the questions of fitting, shrinking, warping, and the like, Rose Pearl must eventually take its place below the combination of rubber and gum teeth, and still lower as compared with gold plate and continuous gum work.

All these defects are beyond the help of the so-called "improvements," upon which so much stress is laid at the present time.

One other advantage claimed for Rose Pearl merits a passing notice—to wit, "it displays skill to advantage." When the patient pays his bill, he supposes it is for services rendered, not for having served as a sign-post for the dentist. Besides, it is questionable whether such an item ought to have weight in the mind of a professional man in the selection of means or material for the relief of suffering humanity.

In conclusion, if all patents hawked upon the profession were reported upon promptly, freely, and truly, by impartial committees, as their respective merits deserve, it would be better for all the parties interested.

Geo. E. Hayes, R. G. Snow,
A. P. Southwick, N. Whitcomb,
G. C. Daboll, J. H. Giffing,
L. F. Harvey.

SOUTHERN DENTAL ASSOCIATION.

To the Editor of the Dental Cosmos:

In an editorial article in the January number of the Dental Cosmos, discussing the subject of a call for the formation of a Southern Dental Association, it is stated that "other matters than sectional or political questions have *fully* engaged the attention of the delegates" composing the American Dental Association. (The italics are my own.) Now, while no one can justly claim that any considerable portion of the time or the attention of the members of the American Dental Association has been devoted to matters foreign to the objects contemplated in its organization, and while the writer disclaims all sympathy with the formation of any professional or scientific society which shall be based, in any sense, on sectional or political grounds, he cannot forget that on one occasion the Association did pass certain resolutions which were earnestly opposed, and subsequently protested against, on account of their sectional and political tendency. I allude to resolutions passed at the meeting in Boston, in 1866, which were probably overlooked by the editor of your journal, when penning the article in question.

It required no prophet to foresee the effect that the passage of such resolutions, by a body claiming to be strictly professional, would have upon a portion of those whose political views were not in agreement

with those of a majority of the Association. The noble sentiments expressed by the editor of the DENTAL COSMOS at the Chicago meeting were doubtless forgotten for the moment, and the writer is heartily glad to learn that "the sober second thought" of the editor has again placed him right on this point of putting all sectional or political questions entirely out of view, in all movements involving either "the cause of science" or "the interests of our profession."

With the exception of the instance above mentioned, I cheerfully bear testimony to the uniform courtesy and impartial action of the Association toward all sections of the country, and although pained at the action of the majority in this one instance, I have never regarded it as a cause for more than the earnest protest which was made at the time and placed upon the records of the Association.

SAINT LOUIS, Mo., Feb. 1869. C. W. SPALDING.

ACADEMY OF NATURAL SCIENCES.

HALL OF THE ACADEMY OF NATURAL SCIENCES,
BIOLOGICAL AND MICROSCOPICAL DEPARTMENT.
Philadelphia, February, 1869.

DEAR SIR,—I have the honor to inform you that the Biological Department of the Academy of Natural Sciences, of this city, has been recently reorganized under the above name; and with a view of engaging systematically in biological and microscopical investigations, committees on the following subjects have been established: 1st, Microscope and Accessory Apparatus; 2d, Preparation and Preservation of Objects; 3d, Vegetable Anatomy and Histology; 4th, Animal Anatomy and Histology; 5th, Micro-Chemistry; 6th, Physiology and Hygiene; 7th, Odontology; 8th, Pathology and Pathological Anatomy; 9th, Micro-Photography.

The members of this department, recognizing the importance of focalizing the individual efforts of observers far removed from each other as the most effective means of securing a prompt acknowledgment and general dissemination of new discoveries, cordially invite Microscopical and other Scientific Societies, and individuals interested in these studies, either at home or abroad, to forward to the corresponding secretary any new observations or theories, relating to biology or microscopy, which may come under their notice. They would also suggest, as a valuable means of stimulating research, an interchange of microscopical specimens, either as donation to the museum, or merely for examination. Written communications, pamphlets, or microscopical specimens, forwarded to the care of the undersigned, will be promptly brought before the members of the department, and, if desired, the specimens will be safely returned to the parties sending them.

Respectfully yours,
J. H. MCQUILLEN, *Corresponding Secretary.*

The above circular letter is presented here with the view of bringing it under the notice of readers of the DENTAL COSMOS, some of whom may be disposed to aid in the proposed objects. J. H. McQ.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Vulcanizing.—"Exposure of Animal Substances to Water Gas at a High Temperature—340° *Fahrenheit.* By Benjamin W. Richardson, M.D., F.R.S.—I woke one day not long since from sleep with a dream before me in wonderful reality. I thought I had been at work in the laboratory subjecting animal structures to the same process as that to which the dentist subjects vulcanized india-rubber when he is making vulcanite base. The dream, childish as it was, as coming from no traceable line of connected thought, seemed to me to be worth accepting as a hint to positive work, and so I followed up the ideal by the real with results which I propose to describe.

"We take for our purpose the common vulcanizing apparatus used by the dentist. It is a very strong chamber of iron inclosed in an iron case or stove, with a series of gas-burners at the lower part of the stove. The iron chamber, which receives the substances to be operated upon, is heated by the burners. It is furnished with a heavy iron lid with binding-screws, a safety-valve, and a tube for holding mercury, in which a thermometer is inserted. When we are about to use the apparatus, we place our specimen in the chamber with a little water. The apparatus I have used, and which has been kindly lent me by my good friend and neighbor, Mr. Ballard, has a chamber ten inches deep and five inches in diameter. Six or eight fluidounces of water in the chamber answer very well for one series of experiments, but the quantity may be varied, by which different results may be obtained. Having, then, placed our specimens and the water in the iron chamber, we screw on the lid firmly, interposing what may be called a washer of brown paper between the lid and the chamber at the part where they touch; we screw down the safety-valve, interposing between it and the small opening it covers also a layer of brown paper; we put the thermometer into the mercury, light the gas, and watch the rise in the thermometer up to the point of heat required. The necessary degree of heat obtained, the gas is turned a little down and moderated until the mercury remains steadily at one point, and the experiment is continued for whatever length of time may be desired.

"The specimens of animal structures to be experimented on may be introduced into the chamber in different ways. In some cases we place the specimen directly in the chamber in or above the water; in other cases we put it in an iron flask filled with wet plaster of Paris, lime, carbonate of lime, powdered carbon, clay, powdered Portland stone, or other substance, and subject the whole to pressure by compressing screws. I have constructed a very convenient iron flask for this purpose. It consists of a framework of iron, with two plates of iron to make a false top and bottom. The frame laid on the lower plate forms a flask, and into it the plaster of Paris, or clay, or sand, or carbon, moistened with water, is placed, with the specimen imbedded. Then the upper plate of iron is dropped on, an encircling band of iron is passed over the whole lengthways, two screws in this band are brought forcibly

down on the upper plate of the box, and thus the specimen, with the substance in which it is buried, is firmly incased. The iron flask in this way arranged, is now ready to be placed in the chamber. The advantage of this flask is that when the exposure to heat is completed, and the metal is cooled down, on setting free the iron band the false top and bottom can be removed, and the specimen can be cut out with a small keyhole saw from its iron framework.

"Having stated these preliminaries, I pass to describe some of the results which up to this time have been obtained.

"*Blood.*—Into the chamber of the apparatus a portion of blood-clot, from the blood of an ox, was placed on a shelf with eight ounces of water beneath. The lid of the chamber was firmly adjusted, the heat was raised to 340° Fahr., and was sustained at that degree for one hour and a half. The heat was then withdrawn, and some hours were allowed for cooling. On opening the iron chamber the blood was found almost unaltered in shape, but altogether changed in consistence and structure. It felt like simple caoutchouc, but broke with a bright surface like Spanish liquorice. The natural characteristics of the blood were lost, and on gentle drying the mass became brittle, closely resembling jet. A specimen of blood thus treated has been examined by my friend Dr. Sedgwick, who reports upon it, that it was a bright black, friable, jet-like material Gently rubbed down with a little distilled water, it formed a reddish-brown fluid, which under the microscope was seen to consist of a colored liquid, and reddish granular masses of various sizes. Very many were about one-sixth the size of a blood-corpuscle, reddish-brown, and very irregular in shape. As the solution dried one or two irregularly hexagonal crystals made their appearance. The substance, after twenty-four hours' soaking, was partially soluble in strong solution of ammonia, very slightly in distilled water, and hardly at all in dilute hydrochloric acid, and in methylic alcohol; it was untouched in ethylic ether and in chloroform.

"Into the iron box or flask plaster of Paris was poured in the fluid state, and a clot of fresh blood was immersed in the plaster. The lid was placed on the box, and when the plaster had set firmly, the whole was placed in the chamber with six ounces of water. The temperature was raised to 340°, and sustained for an hour and a half. On breaking up the plaster, after cooling, the blood was found in the same state as that named in the experiment described above.

"*Albumen.*—An egg was placed in the iron flask and surrounded with plaster of Paris in the fluid condition. When the plaster was entirely set the flask was put into the chamber with six ounces of water, the temperature was raised to 340°, and was sustained for an hour and a half. After cooling, which was very rapidly effected by immersing the flask in cold water, I found, on removing the egg, that the shell was nearly full of a beautiful transparent golden or amber-colored fluid, very thin, and running like dissolved gelatine. In the course of a few hours this fluid was slightly gelatinized. The membrane lining the shell was detached, but not destroyed; the shell was dry, brittle, and firmly attached to the surrounding plaster. The experiment was repeated with another egg, but was modified by allowing the apparatus to cool very slowly in the air at 60°. On breaking the plaster and cutting through the egg, no fluid was found, but in the centre a soft yellow substance (probably the yolk), about the size of a hazel-nut, and slightly glistening on the surface. On

gently drying this substance, it became firm, retaining its color, and looking like amber, but not so hard.

"*The Body of a Toad in Carbon.*—The iron flask was partly filled with fluid plaster of Paris. On this layer a bed of vegetable carbon, in fine powder, was laid, and the body of a toad recently dead was buried in it. The carbon mound was next inclosed in plaster; the flask was closed, and half an hour later it was placed in the iron chamber with ten ounces of water. The temperature was first raised to 350° Fahr., but was brought down to 340°, and was retained at this degree for an hour and forty minutes. The gas was then turned off, and the apparatus was allowed to cool slowly. On opening the flask the body of the animal was found to be altogether destroyed, and so mixed with the carbon that no part of it could be defined.

"*The Body of a Frog in Sand.*—The body of a frog recently dead was buried within the iron flask, in moist fine sand compressed with moderate firmness. The flask was then put into the iron chamber, with six ounces of water, and the temperature was raised to 340° Fahr., and sustained for an hour and a half. The flask was opened twelve hours afterward, and the results of the experiment were found to be nearly the same as when carbon was employed. The animal was destroyed, and no distinct organ or structure could be distinguished.

"*Body of a Frog in Plaster of Paris.*—Fluid plaster of Paris was poured into the iron flask until the flask was half full. The body of a frog recently dead was now laid on the plaster, and allowed to mould itself to it. When the plaster had become rather firm, another quantity of fluid plaster was poured in, so as to bury the frog completely and fill the flask. An hour later the flask, which had been closed, with pressure, was placed in the iron chamber. The temperature was raised to 340° Fahr., and sustained for two hours. Twelve hours later the flask was opened, and a mould of the frog was found, the organic soft parts of the body having been destroyed. At the lower part, in the centre, was a black spot; the spot consisted of blood which had gravitated to the lowest part. Besides this, there was a little *dêbris* of earthy part of bone within the mould. The impression of the body was beautifully marked in the plaster.

"*Body of a Fish in Plaster and Alum.*—Some plaster of Paris, made into a fluid with water containing alum in solution, was poured into an iron flask until the flask was half filled. The body of a dead fish, a common sprat, was cut in half transversely, the two halves were laid upon the plaster, and the flask was filled up with fluid plaster and closed. When the plaster was firm the flask was placed in the iron chamber, with four ounces of water, and the temperature was raised to 340°, and was sustained at that degree for an hour. Twelve hours afterwards the flask was laid open, and the plaster cut in half, when two moulds were found, one of the upper, the other of the lower half of the fish. The markings of the body of the fish were delineated on the mould; a small portion of bone (spinal) was left; a dark-colored fine spot, surrounded by a shiny scaly substance, indicated the position of the eyeball; a little filamentous *dêbris* remained, consisting probably of the scaly covering of the animal.

"After exposing the body of a dead fish to heat in plaster of Paris as described in the last experiment, I made two comparative experiments. In the first of these I placed another similar fish above the water in the

iron chamber simply—not incasing it, that is to say, in any substance. The heat was then raised to 340° Fahr., and sustained for an hour and a half. Twelve hours afterward, on opening the chamber, the fish was found to have been entirely destroyed, with the exception of some small portions of the scaly covering. In the second comparative experiment, by means of a rod, I plunged the body of a dead fish suddenly under molten lead. The whole of the structure of the animal was immediately reduced to a charred mass, the carbon alone remaining undestroyed. I noticed that a portion of the charred mass, spongy in character and light, retained the form of the animal as it floated to the surface of the lead; from which I infer that it would be possible to obtain what might be called a carbon skeleton of an animal—a skeleton, that is, of the base on which all the organic structures were formed during life. From the first of these two experiments it is clear that exposure of an animal body direct to water gas at a high temperature is rapidly destructive. From the second experiment we learn that the sudden exposure of an animal to intense heat without moisture destroys by a different, or, at all events, by a modified process. This may be due to rapidity of action from the greater heat, the lead while in the molten state having a temperature of 604° Fahr.

"*The Eyeball in Plaster of Paris.*—The eyeball of an ox was placed in the iron flask surrounded by plaster of Paris in the fluid state. When the plaster had set, the flask was placed in the iron chamber with six ounces of water, and the heat was raised to 340° Fahr., and was sustained at that degree for an hour and a half. Twelve hours afterward, on opening the flask, a very perfect mould of the eyeball was found in the plaster, but all the structures were resolved and removed except the pigment. At the bottom of the mould there lay a dark thin membranous substance, perforated in the centre, and being, I think, the posterior part of the iris, with a portion of the choroid.

"*Sponge in Plaster of Paris.*—A portion of fresh clean sponge was placed in the iron flask, and was surrounded with plaster of Paris in the fluid state. The flask was closed with gentle pressure, and when the plaster it contained was firmly set it was put into the iron chamber with six ounces of water. The heat was raised to 340°, and was sustained at that degree for two hours. When the apparatus was quite cold, the flask was removed and opened. On breaking across the plaster of Paris block, a beautiful cast of the structure of the sponge was presented. The sponge was not entirely destroyed, there being left in the mould a sort of fine webwork, which stretched from one raised point to another. This webwork resembled spider's web in lightness and structure; it absorbed water from the air.

"*Body of a Frog in Chalk.*—The iron flask was filled with finely powdered chalk in which the body of a frog recently dead was buried. Water was now poured on the chalk until it was brought to a soft mass; then the flask was placed in the iron chamber with six ounces of water, and for the space of an hour and a half was exposed to a heat of 340° Fahr. On opening the flask after cooling, the chalk was found nearly as firm as it is in natural cliffs. The body of the frog was nearly all destroyed, but a flattened mould of it remained; the markings were less clearly defined than in previous specimens.

"*Body of a Fish in Portland Stone.*—A portion of Portland stone was reduced to a fine powder, and was poured into the iron flask; a fish

was buried in the powder, and water was added until the mass was made of the consistency of good mortar. The upper lid of the flask was then put on, the binding screws were applied so as to produce firm pressure, and the whole was placed in the iron chamber with six ounces of water. The heat was raised to 340°, and sustained at that degree for one hour and a half. Next day the flask was opened, and the powdered stone was found making a solid mass. The body of the fish had been destroyed, but there remained a very perfect marking of the body. The mould of the animal in this case was shallow—in fact, almost flat—and as the block dried the mouldings of the body crumbled rapidly away.

"*Bodies of Animals in Silicates with Lime*.—Mr. Hockin, of Duke Street, supplied me with a solution of silicate of soda and potassa, which he prepares for the purpose of hardening stone. This solution, made into a paste with carbonate of lime, produces a very firm, even stone. I made a paste of this kind, and filled the iron flask with it, interposing in layers several animal substances, viz.—two fishes, an oyster, two cockles, some prawns, and a piece of the lung of the sheep. While the paste was still soft, the lid of the flask was put on, and very firm pressure was applied with the compressing screws. The flask was then dropped into the iron chamber, with six ounces of water, and the temperature, raised to 340° Fahr., was kept up for two hours. Twelve hours later the flask, which had cooled to the temperature of the day, was opened, and was found to inclose a fine solid stone. The stone was cut out and broken with a hammer. The piece of lung was destroyed altogether, but the markings of its structure were delineated, and I shall take advantage of the observation to get a perfect mould of the interior surface of the lung. The organic structures of all the other animals were removed, but the outer hard coverings of the prawns, cockles, and oysters remained so imbedded and blended with the stone that they seemed to form a part of it. The block, indeed, would easily pass for a natural product among the large majority of people; and one of my friends suggests that the fact may open a new business, 'the manufacture of artificial fossil remains.'

"*The Leaf of a Plant in Carbon*.—The iron flask was filled with finely powdered carbon; in the middle was placed a bunch of parsley, the stem of the leaf and the leaf itself. The carbon was wetted, and then firmly compressed in the flask. The flask was next placed in the iron chamber, with six ounces of water, and the heat, raised to 340°, was maintained at that degree for two hours. After cooling the flask was opened, and on breaking across the block of carbon a beautiful tracing of the leaf was found. A portion of the stem remained in a filamentous form.

"It is worthy of notice in respect to the mouldings of animals left in substances in a state of semi-fluidity, that a moulding may sometimes be obtained in relief. This occurs from position and from pressure, at a certain degree of heat, in the process of hardening of the surrounding material. Thus in one experiment a frog was placed within a flask in plaster of Paris, and while the plaster was wet the lid of the flask was firmly screwed down upon the plaster. Here the upper part of the mould of the animal was found (after the exposure to water gas at 340° for two hours) depressed so that the markings stood out boldly, giving an indistinct idea of parts of the body in relief. The imitation was precisely like what is often seen in soft stone in nature.

"*Oyster in Plaster of Paris and Common Salt.*—Plaster of Paris made into a fluid state with solution of common salt having a specific gravity of 1160, was poured into an iron flask so as to fill it in part: an oyster in its shell was laid in the plaster, and the flask was then filled up with the plaster. The whole was placed in the iron chamber, with six ounces of water, and exposed to heat at 340° for an hour and a half. On opening the flask some hours afterward, when the chamber was quite cold, the oyster-shell was seen firmly imbedded in the concrete, and on opening the shell the oyster itself was found to be removed. The shell, forming, as it were, a part of a soft limestone, was strikingly like to shells found naturally in soft stone. For the sake of comparison, another oyster, inclosed in its shell, was plunged under molten lead, and held there until the lead had become solid. Then the lead was melted once more, and the oyster was removed. This shell was charred at the edges, and the valves were loosely adherent, but the inclosed oyster remained, hard in structure, and resembling much, in external appearance, a roasted chestnut when the external covering is removed.

"*Albumen with Phosphorus.*—An egg was imbedded within the iron flask in plaster of Paris, except for a small space on the upper part. An opening was drilled through the shell, and into the opening one grain of pure phosphorus was passed, and was pushed with a thin glass rod into the centre of the yolk of the egg. The opening into the egg was covered, and the flask was filled with the plaster. After the plaster was well set the whole was placed in the iron chamber, with six ounces of water, and the temperature was raised to 340° Fahr., which temperature was kept up for two hours. When the flask was opened some hours afterward, and the plaster was cut through to the egg, the shell of the egg was found to contain a brownish red-colored paste, looking much like the marrow of bone. When the smallest part of this paste was rubbed, there was combustion of phosphorus, showing that this element, although so finely diffused through the mass, was in the free state. The paste was partly soluble in ether, in alcohol, and in water.

"*Albumen with Sulphur.*—An egg was placed in plaster of Paris, as in last experiment. The shell of the egg was perforated, and into the centre three grains of sulphur were passed in small fragments. The opening in the egg was closed, and the flask, filled up with the plaster, was put into the iron chamber, when the plaster was set, with six ounces of water. The heat was raised to 340° Fahr., and kept up to that degree for two hours. Some hours later, the apparatus having cooled, the flask was removed and opened. The albumen was found in the form of a paste of brown color and moderately firm.

"*Blood with Sulphur.*—Some clot of blood was mixed with sulphur, in proportion of fifty parts of blood to one of sulphur. The mixture was placed in a porcelain crucible, and put into the iron chamber over six ounces of water. It was exposed for two hours to a temperature of 340° in the water gas. On removing it, after cooling, it was found in the same condition as the blood that had been subjected to the same degree of heat without sulphur—*i.e.* it was firm and felt like caoutchouc, but broke with a fracture having a bright surface. In a second experiment, blood clot and sulphur were inclosed in plaster of Paris within an iron flask, and were subjected, with six ounces of water, to heat at 340° for two hours. The result was the same as in last experiment.

"*A Portion of an Artery with Sulphur.*—A piece of artery, from the arch of the aorta, measuring one inch long and one inch wide, was laid on a bed of moist plaster of Paris within a small iron flask. Beneath and above the piece of artery was placed a thin layer of finely powdered sulphur. The flask was filled with plaster, closed, and, with six ounces of water, was put into the iron chamber, where for an hour and a half it was exposed to a heat of 340°. After cooling, on opening the flask, the piece of artery, reduced in size and not thicker in structure than tissue paper, was found; it was elastic, and so like a portion of very fine dark india-rubber sheeting, it would easily have been mistaken for that substance. In a few hours it grew hard, and broke with a bright, almost glassy, surface, like vulcanite base.

"*Commentary.*—It will be seen that in these experiments, I have recorded only the results obtained at a temperature of 340° Fahr., and over a period of time ranging from one hour and a half to two hours. What differences would occur from exposure at higher temperatures or lower, over longer or shorter periods of time, remain yet to be determined.

"From what has already been done we may learn, however, something that is of interest, and, indeed, I doubt not that, were the inclination indulged, a great deal of curious speculative argument of analogical character might be put forward. I have no intention myself of gratifying such inclination, and shall confine the comments I make to narrow bounds.

"Let me say, then, as a first commentary on what I have seen, that the process of producing changes in organic animal substances by the means pointed out in this lecture is not likely to be given up if it be once fairly tried by the physical inquirer. It is simple in principle, easy in accomplishment, and in many ways likely to be useful.

"It will be observed from our experiments that, on exposing some animal substance, especially blood, to so high a degree of heat as 340° in water gas, there is no destruction of matter, but very distinct change of character. It will also be observed that the pigmentary matter of the eyeball that was exposed to the same high degree of heat was not destroyed. It will be further observed that when the body of the frog buried in plaster of Paris was removed by the heat, a little dark substance, evidently blood, remained. We see, I think, in these facts the persistent character of the pigmentary structures of animal substances. These seem not merely to be themselves resistant, but, in the case of blood, to hold together other substances with which they are immediately surrounded.

"After the blood the bones seem most resistant, and, in the case of fish, the scaly covering of the body. The shells of the oyster, the cockle, and periwinkle are resistant at 340°, but the inclosed animal is destroyed. The outer covering of the prawn is resistant.

"It will be gathered further from our experiments that animal bodies buried in moist substances and exposed to a heat of 340° Fahr., although almost destroyed, leave more or less evidence of the fact that they have been in existence, the evidence varying according to the character of the bed in which the destruction has taken place. Destruction in vegetable carbon is extremely rapid and complete in respect to all the soft structures of animals: destruction of the same in sand, in carbonate of lime, and in sulphate of lime, is also rapid.

"Under certain circumstances this destruction of animal matter while imbedded in moist substance is attended with the formation of a cast

or mould of the animal, with or without the remaining portions of the more resistant structures. This was well marked in the fish that was incased in plaster of Paris and alum, the body of the animal being destroyed, but a good mould being left. The soft and most highly organized structures of animals are, it is clear, readily removable in water vapor at the temperature of 340° F.; the pigmentary matter and also those structures of animals which contain most earthy or inorganic substance are not, however, so easily resolvable, but have a tendency, in some instances, mechanically to combine with the matter in which they are imbedded. In these results we see much that resembles what is found in the earth as indication of animal remains; for in the earth we find casts of animal bodies, outer coverings of animal bodies imbedded in stone, and bony structures fixed in stone. But to make the analogy of the artificial and natural perfect, we require one other factor in our research—I mean continued and intense pressure while the process of removal of the soft structure of the body is in progress. Then the surrounding material while in the moist state would be forced into the space previously filled by the easily destructible parts of the animal, while the less destructible parts of the animal, such as the skeleton or the horny covering, would become, as it were, a portion of the concrete, and would undergo subsequent solidification with the concrete.

"In relation to this seeming analogy—and I am not prepared to refer to it as anything more at this moment—the most singular fact is that relating to the rapidity with which, in experiment, the changes are effected. What is done in the iron chamber charged with water gas at 340° F. in the course of from one to two hours, might, if the facts were not known to us, pass for the work of a long period of time. At this point the argument from analogy of the artificial with the natural must be suspended until experiments at a lower temperature have been carried out. We are, in fact, limited at this moment to one inference—viz., that if, by any commotion or other physical accident, a bed of loose earth, covered with living animals, were suddenly to subside under water, so as to bury all the living things on it, and if, from motion or other cause, the temperature of the mass were raised to 340° F. for the space of from one to two hours, the truly organized parts of all the animals imbedded would be removed, and the indications of the animals having existed would be left either as mere moulds, or as incrustations, or as animal remains from which the organic substance had been removed by the heat, and had been replaced by the surrounding inorganic matter which formed the bed.

"There is a difference in the character of the substance which surrounds organic matter in respect to its power to hasten destruction. Carbon, as the surrounding bed, is specially favorable to the destructive change. This is due, I should think, to the capacity of the carbon to absorb the gases of decomposition. But here it is all open ground for research, and, as Dr. Thudichum has pointed out to me, it will be a fine study to learn the manner in which the resolution of the organic matter occurs during this process of destruction, and what are the products.

"Lastly, when we brought organic substances into direct contact with inorganic, and subjected them to the raised temperature in water gas, we observed certain changes of matter and modifications which require to be reconsidered by the light of further experiment. We may get an advance in this direction in the mode of research by synthesis."—(*Medical Times and Gazette.*)

"*Comminuted Fracture of Nasal Bones and Right Superior Maxilla; Sinking of Eyeball into Maxillary Sinus.* With Illustration By Prof. Langenbeck. [*Archiv für Ophth.*, bd. xiii., ii., s. 447.]—Dr. Langenbeck gives an account of a railroad official whose head was caught between a locomotive and its tender. The eyelids were torn away from the orbit, and a deep wound ran down from the inner canthus to the upper lip. A probe could be passed into the antrum, not a trace of the eyeball could be found; while in the orbit was a bluish-black pulsating mass. The nasal bones comminuted. Patient conscious, but sleepy, pulse slow, violent pain on right side of head. A week afterward, as head-symptoms disappeared, and the extravasated blood had been somewhat absorbed, a closer scrutiny could be made. The eyeball was discovered to have escaped from the orbit into the antrum by a hole, in the orbital margin of the upper jaw, big enough to admit the finger easily—the axis of the eye standing vertical, the cornea downward.

"The fragments of bone were adjusted as well as possible, and the eyeball replaced in the orbit. It was uninjured, and vision was perfect.

"About ten weeks after, by two blepharoplastic operations, the eyelids were brought into a tolerably good condition. They could be closed, and usually so remained, but could be opened enough to expose the cornea and permit sight. The globe was however perfectly immovable. About five months after the injury, ulceration and suppuration of the cornea occurred, and the globe atrophied."—(*New York Med. Jour.*)

"*Amaurosis from Neuralgia of Dental Nerves.*—In Zehender's *Klin. Monatsbl. f. Augenheilk.*, Dr. Alexander describes a case in which for five weeks the patient had experienced a constantly increasing defect of vision in both eyes, without any change in the appearance of the organs excepting some symptoms of hyperæmia of the pupil, which the ordinary antiphlogistic treatment failed to remove. The patient suffered from neuralgia of the dental nerves connected with carious teeth; upon the extraction of the latter the dental suffering ceased, and soon afterward the loss of vision was removed; at first on the side corresponding with that from which the decayed teeth were extracted, but after the lapse of a few days the sight of both eyes became fully restored."—(*Centralblatt f. d. Medicinisch. Wissenschaften* and *Amer. Jour. Med. Sci.*)

Reproduction of Bones and Nerves.—"M. A. Dubreuil communicates to the *Journal de l'Anatomie et de la Physiology, etc., Ch. Robin,* the following note upon the cicatrization of bones and nerves:

"Having removed from rabbits the middle portion of a radius with its periosteum, and having seen the bone reproduced, he compared these results with those obtained after the resection of nerves, and deducts therefrom the following conclusions, viz.: When a portion of the bone or of nerve is resected, the loss of substance is replaced by a tissue which, at the end of some time, undergoes *osseous or nervous substitution*, for which it is not at all necessary that the normal sheath of the portion excised, whether periosteum or neurilemma, should remain."—(*Chicago Med. Jour.*)

Rachitis and Dentition.—According to Dr. Bohn (Dr. Pflaum, *Med. and Surg. Reporter*), "rachitis retards dentition, because the teeth are

more than any other part of the skeleton influenced by any disorder of the constitution, which injures ossification. The abnormal prolongation of the pauses of dentition (for the incisor teeth more than one, for the other more than two months in average) is often the first symptom of the commencing rachitis, and ought to be an indication to direct the nutrition of the child in time into the right way."

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"*Primitive Syphilis of the Lips.*—Syphilis of the mucous membrane of the mouth and jaws is recognized as a secondary or tertiary form of the disease commencing in the genitals or the region of the anus. Those cases on the other hand are rare in which syphilis most undoubtedly, or with a probability amounting almost to certainty, occurs as a primitive affection of the oral mucous membrane, especially the lips, and thence extends to the general system. Professor Segmund, of Vienna, in 1865 called attention to the increasing frequency of affections of the lips of primitive syphilitic forms (indurations, papulæ, ulceration), and this opinion has been confirmed by subsequent experience in his own private and hospital practice. This observation has, in addition to its importance with regard to pathology and treatment, a high social significance. From 1861 to 1867, seventy-three cases of these primary affections of the lips came under the notice of Professor Segmund; of these, thirty-two were presented at the hospital, and forty-one in private practice. These seventy-three cases of syphilitic affections of the lips occurred out of 5551 syphilitic patients. The disease was observed much more frequently in the upper than in the lower lip. The most frequent explanations as to the cause of the affection having been contracted were, in males, smoking, and the use of certain tools, and, in women, the rubbing of a spoon against the upper lip, and also the habit of holding between the lips thin, sharp, and pointed instruments, such as are used in sewing, arranging flowers, drawing, painting, working in card-board, and such like occupations. The position during sleep is a point of some importance; primitive and consecutive forms of syphilis are found with greater frequency on that side upon which the patient sleeps; the epithelium is macerated by the constantly collecting fluid. The syphilitic affections rarely occur in the lip only; as a rule other parts of the oral and buccal regions are involved. The lips are affected with slight abrasions and the several varieties of primitive ulcer, in the same way as the genitals. These affections of the outer parts of the lips, in consequence of the pain they cause, seldom pass unnoticed, whilst those in the interior of the mouth are often overlooked, and only discovered when in consequence of extensive secondary affections the seat of primary inoculation is carefully sought for. It is worthy of remark that these affections of the lips occur in all ranks of society. Segmund passes over the special etiological reports appertaining to these affections, as they are in many cases doubtful, and moreover touch upon scandal. Labio-genital coitus could be clearly proved in some cases, and also in others contagion by means of paint brushes, tobacco pipes, drinking vessels, etc., was made out. The syphilitic affections of special importance to the practitioner are those produced through kissing. Any method of transferring syphilis to a healthy individual from the side of one previously affected at an earlier or later period, but evidently and to a superficial observer cured of the disease, is of the greatest importance, and even these

methods have, according to Segmund's experience, occurred with great frequency, and form a very noteworthy but often neglected mode of origin of the infection. Great caution, then, is required in one's decision upon the perfection of the cure in oral forms of syphilis, the signs of which are often so slight that the uninitiated fails to regard them as sources of infection.

"The treatment of the syphilitic affections of the mouth differs from that of similar affections of the genital and anal regions only so far as the local conditions require. The earliest possible cicatrization prevents a further extension of syphilis to other parts, and spares the patient much trouble. Ulcers situated on the lips should be cauterized with a solution of corrosive sublimate in absolute alcohol (one part to twenty), and afterward covered with mercurial and soap plaster; cauterized patches in the oral mucous membrane should be covered with blotting-paper. Small clefts heal rapidly with the employment of a salve of ammonia chloride of mercury, one part to ten of lard.

"Cauterization, occlusion, and the earliest possible healing of syphilitic affections of the mouth are, concludes Professor Segmund, of very great importance, because the tissue elements of the mouth, jaws, and fauces, loosened by the syphilitic infiltration, pass with greatest rapidity and readiness into the stomach and the general circulation of the nutritive fluids.

"To give a proof of the possibility of such a mode of syphilitic extension, Professor Segmund makes the observation that the severest and most obstinate forms of secondary and tertiary syphilis are met with in patients who have had or still have excessive lesions of the fauces and jaws.

"Professor Segmund finally lays particular stress upon diligent cleanliness as an indispensable condition for the rapid healing of affections of the mouth."—(*Wiener Med. Wochenschrift*, *Schmidt's Jahrbücher*, and *Half-Yearly Abstract.*)

Syphilis.—Of this terrible malady the *Lancet* pertinently observes: "When we consider syphilis as a whole, what a marvelous disease it is. It depends upon a virus which readily generates its like; it is specific in its outward manifestations, and definite in its course. Contrasted with the effects of other animal poisons, how tardily the manifestations are evolved. There is the incubationary stage before the appearance of the local lesion; another interval, and the various secondary phenomena, separated from one another by broken periods of rest; and lastly, in some cases, we have a third series, more or less remote, and sometimes separated from the former by many years of average health. During the time that these morbid processes are being manifested in the individual, he is endowed with the power of transmitting a syphilitic taint to his offspring, which shall leave its mark on their tissues years afterward, modifying the products of their nutritive and developmental functions in a way which transcends our power to explain. On what do these cyclical charaters depend? and how can we explain a morbid process marked by periods of activity at one time, and latency and dormancy at another? Virchow has attempted to fathom the cause by supposing that each separate diseased tissue is the source whence the infecting elements are derived, by their gradual absorption and accumulation in the blood."

Syphilis.—The Berlin correspondent of the *Western Jour. of Medicine* gives the following resumé of a lecture by Virchow, on the constitutional changes in syphilis: "Hitherto, we are informed, the outward manifestations of the disease have been the only ones receiving attention. We now know that there exists a whole series of symptoms affecting the internal organs, characteristic of the disease. The brain suffers a softening; the root of the tongue loses its glandular characteristics, smooths off to a polished surface from atrophy of its glands; a chronic pharyngitis, the result of the increase of parenchymal connective tissues; the tonsil is likewise attacked and becomes almost obliterated; the heart assumes an hypertrophy; the pleuræ present cicatrices on their surfaces, from the contraction and retraction of chronic pleuritis; the liver reduces in size and presents the same cicatrices, in the cases before us, extending completely through the right lobe at its outer third, forming a new lobe; the kidney suffers atrophy, becomes exceedingly pale and granulated on its external surface—the surface of section remains smooth; the atrophy is likewise induced by an increase of the connective tissue, an indurative interstitial nephritis."

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"*Thymol and its Combinations.*—The *thymus vulgaris*, or common garden thyme, is a well-known plant, a native of the south of Europe, where it grows spontaneously in great abundance. In our own gardens it is also extensively cultivated, and among us is used in domestic cookery, and for a variety of purposes. By the usual mode of distillation it yields an essential oil, which is of a reddish color, but which, by a second distillation, may be made colorless and transparent. Its formula is $C^{20}H^{16}=136$; it is soluble in equal weights of alcohol and concentrated acetic acid. Much of the so-called 'oil of origanum,' which for many years has been a very popular ingredient in opodeldoc and other preparations for external use, is only the red or crude oil of thyme. By continuing the process of distillation until most of the oil has come over, it is found to be accompanied by a body which, at ordinary temperatures, is concrete, but which melts at about 111°, and sometimes remains in this state, unless subjected to a temperature much lower than that at which it is usually solid.

"It has generally been known by the name of *thymol*, or the *hydrate of thymyl*, which, on account of possessing acid properties, is now called *thymylic acid*. Its formula is $C^{20}H^{14}O^{2}=150$, and its specific gravity about 1·05. Its boiling point is about 445°, at which it volatilizes without chemical change. It is soluble in about 335 times its own weight of water, and in nearly all proportions in ether, alcohol, and glacial acetic acid. In aqueous solutions of the caustic alkalies, it is soluble with combination, but when boiled with them, or with strong acids, it is decomposed. With most of the alkalies, and with several of the metals, it forms salts which are called *thymylates*, and which are more or less interesting to the chemist.

"Thymylates of ammonia, lime, potash, and soda are all very soluble in water and alcohol, and produce precipitates with most metallic salts.

"The basic thymylate of the protoxide of mercury ($C^{20}H^{13}HgO^{2}Hg O=557$) is insoluble in water, alcohol, or acetic acid, and is not decomposed by the addition of dilute sulphuric or nitric acids. With

silver it forms a salt which is insoluble in water at all temperatures. With a mixture of acetic and sulphuric acids it forms a compound known as sulph-aceto-thymic acid ($C^{24}H^{16}S^2O^{10} = 272$), or as it is sometimes called thymyl-sulph-acetic acid, which is soluble in water, and forms salts with several bodies, soluble in water and alcohol.

"With sulphuric acid it forms thymyl-sulphuric acid, which forms several salts with alkalies and metals. The thymyl-sulphates of ammonia, baryta, lead, potash, and soda are all soluble in water and alcohol. With sulphurous acid it also unites, and forms salts with all the above bases, all of which are soluble in water and alcohol. The odor, and, when diluted, the taste of thymylic acid, is very agreeable, and for this reason it has very recently been proposed by a French chemist as a substitute for creasote and carbolic acid, in all cases where their use as therapeutic agents is usually indicated. M. Bouilhon, the chemist referred to, states that it has the valuable property of combining with, and preserving from putrefaction, the skin and animal tissues. He very strongly recommeds the substitution of this agent in hospitals and dissecting rooms, for topical use, though he says nothing of its internal use. It has long been known as a remedy for toothache, for which it is employed in the same manner as creasote. We have no doubt that for many purposes this agreeable substitute for creasote and carbolic acid will be generally adopted. Its comparative insolubility in water, and its high price, may, however, prove serious objections on the part of many surgeons against its use in the place of the other compounds named, and thus have a tendency to retard its introduction among us, and prevent its use in many cases where an aqueous solution is required, but of a greater strength than one part to 335, which of course is the strongest.

"But many of these hydro-carbons, which are only soluble in from fifty to five hundred times their weight of water, are very readily soluble in glycerin, and, as we believe thymylic acid is one of these, it may thus be employed as strong as would in any case be desirable."—(*Jour. Applied Chemistry.*)

Carbolic Acid in Wounds, etc.—Dr. J. Fayrer observes (*Med. Times and Gaz.*) that "with reference to the use of carbolic acid in the treatment of wounds or breaches of continuity, its chief use is in the earlier stages before repair has commenced—that is, before healthy granulations have appeared. When this has occurred, I believe that, in ordinary circumstances, it is better to lay aside the carbolic acid, for it is detrimental to all development, and retards, rather than expedites, repair. But I believe that in the earlier stages of treatment of wounds, abscesses, etc., it is invaluable, and should be generally resorted to. I propose trying petroleum, as an antiseptic, in the cases in which carbolic acid is now used."

"*Nitric and Nitrous Oxides in the Oil of Vitriol Chambers.*—Both these gases form part of the atmosphere within the lead-chambers, the presence of nitrous oxide being supposed to be due to the reduction of nitric oxide by means of the sulphurous vapor. Recent experiments of R. Weber, however, tend to show that the former gas results indirectly from the action of an excess of sulphurous acid upon nitrous and nitric

acids in presence of water.* Inasmuch as the formation of nitrous oxide involves a loss to the manufacturer, Weber recommends that what he has established will obviate this decomposition, *i.e.* the constant presence of a certain proportion of *sulphuric* and nitric acids, in presence of which no reduction to nitrous oxide can take place. There must, it seems, however, be always certain parts of the chambers, as for instance, in the neighborhood of the steam-adits, where the formation of nitrous oxide cannot be prevented."—(*Druggists' Circular.*)

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Action of Nitrous Oxide.—The *Med. Times and Gaz.* says that "the theory that the anæsthetic effects of the gas were simply due to its producing apnœa was advocated in the discussion before the *Odontological Society*, by Mr. Norton and Mr. Sewill, but was opposed by Dr. Sanderson and Mr. Cattlin as irreconcilable with the results of their experiments. Dr. Sanderson said that the action of nitrous oxide upon the respiration and circulation was the same as that of pure nitrogen—both produced apnœa—but nitrous oxide produced anæsthesia in less than a minute, while, when pure nitrogen was used, anæsthesia did not occur until the patient was already asphyxiated—*i.e.* three minutes or so after inhalation. Mr. Cattlin's experiments on pigs showed that animals deprived of atmospheric air manifested signs of pain when pricked with a spur, although lying as if dead, whereas no such signs of pain were produced when the animal had inhaled nitrous oxide."

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"*Anæsthetics adverse to Union by First Intention.*—Professor Frank H. Hamilton (*N. Y. Med. Record*) expresses the opinion that union by first intention is not so apt to occur after the free use of anæsthetics; and that 'it ought to be regarded therefore as one of the many causes operating to the production of suppuration and its consequences.' He quotes the opinion of Velpeau, that 'after the use of those agents, wounds do not heal so readily by first intention.'"†—(*Pacific Med. and Surg. Jour.*)

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Asphyxia in Etherization from Artificial Teeth in Glottis.—Dr. Mason Warren says in his "Surgical Observations with Cases" (*Half-Yearly Abst.*) that, "in the course of twenty years, not a single death can be fairly attributed to the use of sulphuric ether. In the Massachusetts General Hospital alone it has been employed over twenty thousand times, without a single unfavorable occurrence. In some cases, particularly in young persons and females, I have seen disagreeable and troublesome symptoms occur from prolonged etherization. From the great frequency of the use of artificial teeth, the following not unusual

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* In view of this fact, it would be well to have an aqueous solution of sulphurous acid or of one of the sulphites, as bisulphite of soda, in the bottle nearest the retort for purifying nitrous oxide gas as it comes over. Besides, if this mode of generating nitrous oxide is sufficiently practical, it might be substituted for the present troublesome method of obtaining that gas.—Z.

† While convinced such is not the case with nitrous oxide, but, on the contrary, that it rather promotes than retards cicatrization, yet, as the question can only be settled by enlarged observation, a record of the experience of the profession on the subject is desirable, especially on the point of more immediate dental interest, whether the gums heal less readily after extraction of teeth under nitrous oxide anæsthesia than without?—Z.

accidents may be mentioned. In one instance, after operating upon a lady under ether, for a tumor in the thigh, I found her in an apparently dying state; respiration having almost ceased, and the pulse being just perceptible. Passing my finger down the throat, in order to admit a current of air to the larynx, I discovered an entire upper set of artificial teeth closely forced down on the glottis. These being withdrawn, it was only after a long persistence in the use of the usual remedies employed to recover a person from drowning, that the regular course of respiration and circulation was restored. She then became violently delirious for a time, but recovered well. I have once or twice, in the course of etherization, found artificial teeth loose in the mouth; and now generally inspect it previously, when I have suspicion of their presence."

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"*Marshall Hall's 'Ready Method.'* — Mr. Richard Ellis, in a recent issue of the *Lancet*, gives the following simplified formula for the application of 'Marshall Hall's Ready Method:'

"Instantly placing the patient on the face and side, supporting the head.*

"Unfasten the clothes about the neck and chest, braces, etc.

"Wipe and clean the mouth and nostrils.

"Raise and support the chest on a folded coat or bundle.

"Roll the patient constantly and gently, from the face to the side, and back again, occasionally changing the side supporting the head.

"On the completion of each turn to the face, make a brisk pressure on the back, between and below each shoulder blade.

"Dry and rub the patient briskly, rubbing upward."—(*Med. Gazette* and *Med. Archives.*)

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Dental Hemorrhage.—A surgeon writes to the *Medical Times and Gazette:* "The plan I have adopted for many years with invariable success is a ready and simple proceeding. I obtain a soft wine cork, and cut at one end an exact copy of the fang or fangs of the extracted tooth, leaving a projecting shoulder on each side. The thick portion of the cork is cut just long enough to allow the jaws to close when it is *in situ*, and across the end a groove to receive the teeth. Having placed a small piece of lint across the cavity, the point of the cork is pressed firmly down into it, taking care that the edges come well over the sides of the cavity. The mouth is then closed and firmly tied with a handkerchief or bandage, and kept so until there is no longer any danger of hemorrhage. There cannot well be any more certain and easy plan of operation than this, and the materials—a sharp knife and a soft cork—are always at hand."†

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Preserving Anatomical Specimens.—The *Chem. News* says that, at a late meeting of the Manchester Literary and Philosophical Society, "Dr. Alcock showed a preparation preserved by corrosive sublimate in a manner which he recommended for fine dissections. The preparation had been kept in an open cup for twelve months, simply water being

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* By resting the forehead on the arm.—Z.

† Styptics should always be employed in conjunction with such mechanical appliances for the arrest of local hemorrhage.—Z.

added occasionally to supply what was lost by evaporation. The advantages of the plan were, very perfect preservation, no necessity for closing up so that the specimen could not be got at, no fear of losing a valuable dissection from accidental evaporation, as where spirit is used, and cheapness. The method adopted was to prepare a saturated solution of corrosive sublimate in alcohol, and when a dissection in water is in progress, a small quantity, as half a teaspoonful, of the solution is to be added from day to day if the slightest appearance of putrefaction is observed, but no more of it is used than is absolutely necessary, and by the time the dissection is completed, the specimen has become imperishable, from the union of the corrosive sublimate with the tissues, and it may then be kept in pure water, either open or mounted in the usual way."

"*Cement for Leather.*—Of many substances lately brought very conspicuously to notice for fastening pieces of leather together, and in mending harness, joining machinery-belting, and making shoes, the best is made by mixing ten parts of sulphide of carbon with one part of oil of turpentine, and then adding enough gutta-percha to make a tough thickly flowing liquid. One essential prerequisite to a thorough union of the parts consists in freedom of the surfaces to be joined from grease. This may be accomplished by laying a cloth upon them and applying a hot iron for a time. The cement is then applied to both pieces, the surfaces brought in contact, and pressure applied until the joint is dry."—(*Amer. Artisan.*)

Copying Ink.—"The Autier sympathetic ink, for giving a copy of a letter without any press, and without previously moistening the copying paper, consists of a decoction of Brazil wood and glycerin. When any paper is written upon with this ink and laid upon tissue paper, the simple rubbing over with the finger is sufficient to produce the desired transfer."—(*Ibid.*)

"*Hydrogenium—a New Metal.*—Professor Thomas Graham, Master of the Mint in Great Britain, a distinguished chemist, and author of the widely known Elements of Chemistry, has written a letter to Professor Horsford, of Harvard, announcing his discovery of 'hydrogenium,' a white magnetic metal, of specific gravity about 2, and appearing to have considerable analogy to magnesium. Professor Graham states that palladium, with occluded hydrogen gas, is an alloy of hydrogenium. Palladium was discovered by Wollaston, in 1803, in the ore of platinum, of which it seldom forms so much as one per cent. It is also found in Brazil, alloyed with gold, and from this source the supplies of the metal are obtained."—(*Phila. Ledger.*)

"*Glycerin in Moulding in Plaster.*—Dr. Hoffman, in the *Journal de Chimie*, recommends the addition of a coat of glycerin to the ordinary soap coating used in moulding in plaster. For some time past, the separation of the proof from the mould has become more difficult, from the deterioration of soap."—(*Boston Jour. Chemistry.*)

THE

DENTAL COSMOS.

NEW SERIES.

Vol. XI. PHILADELPHIA, APRIL, 1869. No. 4.

ORIGINAL COMMUNICATIONS.

TEMPERAMENTS.

BY VARNUM D. COLLINS, D.D.S., HONG KONG, CHINA.

Our attention having been called, frequently but incidentally, to the subject of Temperaments by the Chair of Dental Pathology and Therapeutics, in the Philadelphia Dental College, we propose to discuss their *causes and characteristics;* and to indicate, in a general way, the *relation* and *value* of such knowledge to the dental surgeon.

Temperament is a general term used to express a condition, quality, peculiarity or difference, observable chiefly in the physical constitution of man. This difference, as the individual develops, permanently affects the manner of feeling, thinking, and acting, so that not only the physical, but the mental and moral habits, tastes, and tendencies become quite marked, and referable to certain classifications, styled temperaments. Indeed, that which is designated the mental temperament, frame or disposition of the mind, is often nothing more than the outgrowth of a peculiar physical organization, or mode of being, compatible with life, health, and longevity. It is true, some hold that the mind has its temperaments as well as, and independent of, those of the body, according as perception, consciousness, memory, intuition, reason, imagination, conscience, will, feeling, desire, propensity, emotion or affection, vary in their natural intensity, educational development or manner of working; while others claim that, as character in man comprises the entire sphere of the reasoning, educated will, so the mental and physical temperaments are nothing more than the sum of the natural and acquired peculiarities and tendencies of body and mind, but often too subtle to be estimated and defined.

Dunglison defines the temperaments to be those individual differences which consist in "such *disproportion of parts,* as regards *volume* and

activity, as to sensibly modify the whole organism, but without interfering with the health." Consequently, temperament, according to him, is a physiological condition in which the action of the different organs is so tempered or regulated as to communicate certain characteristics to each individual.

Williams, in his definition, goes a step further, and teaches that, while "the *unusual proportions* of the different structures or functions of the body to each other constitute varieties of temperament, these structures or functions, though they can scarcely be called *morbid*, yet certainly give a *proclivity* to disease 'in the direction indicated by the temperaments."

Even with these definitions, it must be confessed that the whole subject seems considerably involved and deficient in scientific statement. The peculiarities which constitute temperament are so intimately and permanently related to individual constitutions; to acquired differences of mind and body; to hereditary, climatic, and dietetic influences; to race, religion, habits, and occupation, and so often combined in the same individual, that they cannot be accurately estimated and defined. Science, we know, is classified knowledge, susceptible of statement, analysis, and demonstration in almost every particular. On this account physiologists, for the most part, omit any discussion of this subject, holding that the whole theory, or so-called science of the temperaments, is purely speculative, and based on the abandoned humoral pathology of the ancients, who held that the temperaments depended upon the excess of one or the other of the four supposed humors of the body, to wit: the blood, the lymph, the bile, and the atrabilis. The fact, however, that the old pathologists observed peculiarities or differences of organism and manifestation, and tried to account for and analyze them, is an important consideration, though it does not seem to have stimulated much modern investigation in this direction. Indeed, we have failed to find any physiologist who has discussed the temperaments, *as such*, but all aim to account for physical and mental differences on general physiological principles. It must be confessed that the temperaments so run into each other, especially in America, where so many peoples form the nationality—blending in such an endless variety of shades, that there must necessarily be considerable want of accuracy in observing or defining them. They cannot be demonstrated by anatomy or chemistry (though we believe the chirographist claims this exactness), while the nicest perception, constant observation, and the balancing of relations are necessary in order to grasp and appreciate them fully.

The temperaments, of course, are to be recognized and studied chiefly by the *physical characteristics* which they present, and by the *character* which they impress upon the *feelings*, *thoughts*, and *actions* of the individual in a state of health. Those who have paid most attention to this

subject believe that there are, amid the shadowy and indefinite statements of theorists, in respect to the temperaments, at bottom, the elements of a real science. Is it not true that this study of the temperaments has been too much neglected by professional men, because it has been the hobby, and too much under the special patronage of empiricism?

The so-called sciences of phrenology and physiognomy are based, in reality, on a study and knowledge of the temperaments; though the more advanced phrenologists claim that the *skull* is the real and final demonstrator of race, temperament, character, and life. It is a remarkable fact that long before a human skull had been entombed in the mound at Marathon, or a barbarian awed by the august countenances of Roman senators at the capitol, the human head and face were objects of special study in China. Her literature abounds in treatises on these topics; and often has the writer witnessed Chinese character-readers examining a subject. Those who practice this calling are astute observers of men; and though they possess no scientific knowledge, they attain great skill. The personal appearance of the subject, his circumstances, manner, modes of expression, general deportment, and the hints dropped in conversation, or drawn out by subtle questions, have much to do in forming an accurate analysis of character. Indeed, these Chinese professors, with their printed charts, or plates representing, with great minuteness, the different organs and inherent qualities of the brain, remind one of the phrenological examinations of our own day. In reading character, and foretelling future conduct and fortune, not only do they observe the contour of the head, the different prominences, but the complexion and the entire physiognomy.

Without accepting, therefore, the extreme position of the phrenologist, there is no doubt that differences of sex, race, nation, family, faith, occupation, diet, climate, culture and individual organization, operating upon body and mind from birth, and operating upon races of men through the ages, have produced differences or characteristics which enable the student to observe, study, classify, and generalize facts, constituting the so-called science of the temperaments.

According to the definitions of Dunglison and Williams, the *causes* of temperament are *intrinsic*, produced by a predominance or defect of some function or set of functions viewed in relation to other functions; assuming, in fact, that the temperaments are not really normal conditions or manifestations, because peculiar; when, in reality, *variety in manifestation* seems to be a primal law of nature, at least in the vegetable and animal kingdoms. "Life," according to Bichat, "rests upon a tripod made up of respiration, circulation, and nervation;" which, in their turn, are sustained by a variety of organs, such as the brain, spinal cord, heart, lungs, liver, arteries, veins, nerves, glands, intestines,

etc., all of which have specific functions; but undoubtedly there may be, within the range of health, a predominance or deficiency in some of these organs or functions, acting independently or under certain conditions of food, climate, habits, or exercise, which may stamp the individual, and give him peculiar physical and mental characteristics. In point of fact, these characteristics are everywhere observable among men—such as volume of brain, lung capacity, perceptive power, bony development, etc., but the *causes* only are in dispute. Without citing minor instances, we have illustrating this position the two remarkable cases of Morphy, the chess-player, and Blind Tom, the pianist.

It is claimed, then, in the first place, that temperament is a natural manifestation of human life for the sake of variety. For certain great reasons which we can only surmise, the physical organism is not cast in the same uniform mould; or rather, under precisely the same intrinsic and extrinsic influences. The physical, mental, and moral condition of the parents before intercourse; the action of favorable or unfavorable influences during inter-utero existence, and the circumstances into which the child is thrown after it enters this breathing world, all have a potential influence. There is, therefore, we believe, a wealth of beauty, strength, vigor, gentleness, grace, aptitude, skill, taste, genius, industry, courage, endurance, vivacity, perseverance, quickness, reserve, moderation, etc., and their opposites, developed and distributed among men for the sake of compensation and variety. Carpenter, the eminent physiologist, may be quoted in this connection. It has been noticed, he says, in man as well as in the lower animals, that "there is a *tendency to variation* which presents itself, more or less, in all those races of animals which possess such a *constitutional capacity* of adaptation to changes in climate, habits of life, quality of food and clothing, as enables them to live and flourish under a variety of conditions. Thus we find that the offspring of any one pair of domesticated animals do not all precisely agree among themselves, or with their parents, either in bodily conformation or in psychical character, but that *individual differences*, as they are termed, exist among them. As this tendency to variation cannot be clearly traced to any influence of external circumstances, it is commonly distinguished by the term *spontaneous*." Carpenter claims that this spontaneous variation is everywhere seen in the human race. We would like to quote his whole argument, which is stated with great moderation and fairness, but we can only offer his conclusion, which is, that there is no real difficulty in accounting, "upon the strictest physiological principles, for the widest departures from one common type of conformation which we encounter in our survey of the different races of mankind."

Again, carrying this principle of variation a little further, why may not the same law which holds true in vegetable chemistry, act, to a cer-

tain extent, in the formation of human temperaments? We know that identically the same elements, in the same proportions, which go to form sugar, also form starch, wood, and dextrine. This seems to be a very strange fact; and, as yet, it is unexplained, except on the supposition that the ultimate molecules of the elements combine, in each case, in a certain order of arrangement, producing either starch, sugar, dextrine, or wood. So will we see in a family, by the same parents, children utterly different in physical conformation, dispositions, tastes, and tendencies. We can only account for this on the ground that, in the mysterious laboratory of Nature, there is such a different and nice balancing, adjusting or arranging of the organism, and so acted on, shortly after birth by external and mental influences, as to produce, within the range of health, these striking differences or peculiarities.

We are well aware that a certain class of writers argue that the original differences of temperament are to be accounted for only upon the ground that mankind have sprung from distinct species, and not from a single pair; and that the several races had the same differences among themselves as those now exhibited by their descendants. A very fair discussion of the origin of races is found in Carpenter's Physiology. It is not necessary to go over, at length, his positions, but only to observe that he concludes, from a general survey of all the arguments, *pro* and *con.*, that there is no real difficulty (or at least not so many as on what may be styled the Agassiz theory) in accounting, upon the strictest physiological principles, for the widest departures from one common type of conformation.

Wherever we travel, the physical features of the globe are not more marked than are the differences of mankind, not only in language, dress, manners, customs, occupations, religious and other acquired peculiarities, but also in the color of the skin, hair, and eyes, and in the physical conformation of the features and fleshy portions of the body, as well as the shape of the skull and the size of the bony skeleton. Formerly, mankind were divided into five grand divisions, to wit, the Caucasian, the Mongolian, the Ethiopian, the Malayan, and the American; distinctions based chiefly on geographical and marked physiological differences. More recent investigations, however, especially in the way of *comparative philology* and a better knowledge of the races of mankind, and of their actual emigrations to islands and distant continents, have altered or modified these divisions very materially. The possibility of Asiatic races reaching the islands of the Pacific and the American Continent, has several times been demonstrated, during the last fifteen years. The writer took back to Japan a young man named Toro, who, with seventeen others, had been carried, in a native junk, by stress of weather, oceanic currents and random sailing, to the coast of California—at least eight thousand miles from the point of departure. And within the last

two years, a second instance has occurred. It may be fairly inferred, therefore, that the continent of Asia has furnished, or could have furnished, the original stock which has undergone various transformations since its first dispersion—these transformations having been the result chiefly of climatic influences, modes of life, kinds of diet, and the length of time during which these causes have been in operation. One of the most interesting studies, therefore, in this connection, is that of comparative philology, which, we believe, in the future will solve many of the problems connected with races and human dispersions. In accounting, therefore, for the marked peculiarities called temperaments, we hold that they have come about during the ages—and are continually developing, by all the combined causes of hereditary descent and intermarriage; by climatic, dietetic, and other external influences, as well as habits and occupations of life; physical, mental, and moral culture, the tendency to spontaneous departures, and the general law of variety in the way of development or manifestation.

(To be continued.)

THE PATENT SPRING PLATE REVIEWED.

BY W. H. TRUEMAN, D.D.S., PHILADELPHIA.

The advance in mechanical dentistry would no doubt have been more rapid than it has, if all the talent it has enlisted had been directed more to the discovery of new and the improvement of old ideas, and less to the rapid accumulation of wealth. Those practitioners who can take a retrospect of two decades placed side by side, cannot have failed to observe how often its advance has been checked by those who have strength of body and mind to occupy the front ranks desiring to be carried on the shoulders of their weaker brethren as a reward for some real or fancied advance they have made, nor yet can they fail to have noticed how often this ungenerous conduct has resulted in a fall so severe as to consign the unfortunate to a place among the limping and lame ever after.

These remarks have been prompted by reading an article in a recent number of the Dental Cosmos, introducing the Patent Spring Plate to the profession, which the writer would respectfully ask the privilege of reviewing (*i.e.* examining from another stand-point).

In the first paragraph devoted to the subject we are met with a sweeping denunciation of the present method of inserting partial dentures. We are told that "it is notoriously unsatisfactory, alike to dentist and patient,"—so much so, he hints, that sound teeth are extracted for the purpose of inserting entire sets. "Clasps are annoying, insecure, and injurious, while suction plates more or less impair taste and speech."

Sad indeed must have been the experience that told this doleful story; or bright indeed must be the new light to throw so dark a shadow upon our present knowledge.

That clasps are often annoying, insecure, and injurious, is no reason they should be so. They can be and *are made* to hold plates as secure and with as much satisfaction to the dentist, comfort to the patient, and as little injury, as by any method now known depending upon the remaining teeth. To accomplish this they must be made and applied with a judgment too many are careless to acquire. Partial suction plates are often made unusually large; there is no necessity to cover the entire roof of the mouth, if they are accurately fitted. It is true, they do more or less impair taste and speech, even as a new pair of boots very often impair the gait and temper of the wearer, *until he gets used to them.*

The need, not so much of a new method as the more skillful application of those we now have, has been indeed long and severely felt by the profession.

The second paragraph presents us with the writer's *moderate* claims. The Spring Plate he claims to have invented is the *sine qua non* for partial dentures, "entirely independent of clasps or suction, * * * * leaves the roof of the mouth uncovered, * * * * * so firm as to never tip or rock from pressure on either side, more comfortable to the wearer, and enables the dentist to retain every natural tooth—the artificial ones matching them." It might be well to receive this *cum grano salis*, notwithstanding he may have "scores of testimonials from those who have tested in their own mouths its charming practical effects." Elated with this success, and urged no doubt by the laudable desire to do good (he tells us), he visited several of our large cities, and personally exhibited his new method to the various dental colleges, inviting their examination and criticism. Did he also invite them to pay down the fifty dollars for the right to use it, or was the cordial reception, open and frank acknowledgment, and hearty indorsement, sufficient; or were these ovations, like some other of his statements, creatures of his own fevered imagination?

The article was evidently written in haste, which may account for his omitting to notice the difference between his patent plate and those formerly in use on the same principle, some of which he had an opportunity to examine. He will find attention called to the idea of holding plates in the mouth by an "elastic but positive pressure" in at least one of our text books (recognized, I believe, by all the dental colleges), Richardson's Mechanical Dentistry. In chapter sixth (page 210, edition of 1860), a full description of the spring plate is given, with some very practical cautions as to their construction and use, which it will be well for those inserting them to observe, as they may find, as the writer has from actual experience, their value.

He is remarkably silent as to the claim of his patent, both in the article in question and the circular now lying before me, nor does the notice in the patent record throw much light upon it. It reads as follows: "Patent No. 85,653. Granted to Edward B. Goodall, Portsmouth, N. H., Jan. 5th, 1869. In this invention the artificial dentures are composed of elastic plates having the teeth inserted therein. These plates are held in the mouth by an elastic but positive pressure as distinguished from suction or atmospheric pressure, and the clasps by which dental plates have hitherto been secured in position." Does he claim as new and original the principle of holding plates in by "an elastic but positive pressure," or the adaptation of rubber to this special use, or both? It matters but little what construction he may put upon it, the fact remains (and facts are very practical). The idea proposed to be covered by this patent has been for many long years the *public* and *common* property of the profession, and the would-be inventor and those dentists who have *really* indorsed him have shown themselves inexcusably ignorant of their profession not to know it. He will no doubt find not only some but many dentists quite ready to say (from experience) of this principle, by no means new or untried, that it *will* in a great many cases press upon the teeth and produce not only soreness and discomfort but actual and permanent deformity of the dental arch. These disadvantages have so far kept this form of plate out of general use in the profession: it remains to be seen whether the *patent* will charm them away. He tells us it has no clasps. By what name does he propose to designate that portion of the plate he makes to fit so accurately around the teeth as to prevent the smallest particle of food from being secreted, and pressing against them with sufficient force that the severest tests will not tip or rock the plate on either side? If he can apply any other name than a series of collars or stay clasps, will it not certainly be a distinction without a difference?

Eight or ten years ago the writer, as a mechanical dentist, made a number of these plates, fitting half-round wire around the palatine surface of the bicuspids and molars. It was then represented as an old idea revived; more careful manipulation it was hoped would make it more successful than it had been. But although made of platina gold, the most elastic material we can use in the mouth, they seldom lasted more than one or two years, on account of the gradual expansion of the arch. One gentleman, on returning a plate to have the clasps extended, remarked that he did not relish the idea of having his jaws expanded while provisions were so high.

In conclusion, these remarks have been prompted by the desire every professional man should feel to jealously guard the interests of his profession, and to *discourage* and *resist* all attempts to lay unjust burdens upon it, especially by those claiming to be brethren.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Continued from page 70.)

Before proceeding further, let us return to the consideration of an abnormal alimentary condition previously overlooked. We have already appreciated the manner in which the derangements of dentition occasion a hyperæsthetic and hyperæmic condition of the intestines, directly or indirectly originating pathological conditions of their mucous membrane; now a reverse state of things may exist from a deficient innervation and circulation, as evidenced in the most trying and obstinate constipation.

This condition has been explained upon the supposition that the exalted state of developmental activity displayed in the jaws during dentition monopolizes nervous or vital energy, to the temporary and often permanent detriment of parts distantly located, and also upon the assumption that nervous derangement, when of certain form and intensity, may give rise to symptoms totally unlike those which follow a nerve undulation of different length or force ; for example, a normal nerve undulation impinging upon the cells of the intestinal muscular tissue, sustains normal peristaltic motion, but a slight deviation in their length or number may occasion an unhealthy rapidity, whereas a greater variation may produce torpidity; thus we have an illustration of the same cause producing, through the same agency, diverse effects, or more vulgarly, "blowing both hot and cold."

Be the rationale what it may, of this one fact we are aware, that dentition may cause a constipated condition of the bowels, and that measures capable of regulating its progress will simultaneously exert an equally beneficial effect upon their functions.

The violence of the affection may vary from a simple diminution in the regular number of stools, and a slight alteration in their consistence, to an alarming absence of evacuation, or an excessively hard or scybalous condition of the fæces.

Where the constipated tendency is present, the diet should be consulted, and any constituents which have already been mentioned as likely to give rise to such condition, discarded, and where the child is nursing, much good may be effected by confining the diet of the mother principally to articles of a laxative nature.

The use of laxative enemata will be found very beneficial, as a mixture of milk and molasses with a little chloride of sodium, or a suppository of white Castile soap shaved to a blunt point, dipped in water, and inserted within the anus. The most convenient apparatus for in-

jecting is the ball and double tube syringe, one end projecting in the anus, while the other is dropped in a basin of warm soap and water, one pair of hands sufficing for its easy application.

A very good suppository may be made of 3 parts suet and 2 parts of cocoa butter moulded in the conical form; the cone is to be inserted entire, and, melting with the heat of the parts, is discharged with the fæcal evacuation stimulated by its presence.

According to Merriman, in cases of habitual costiveness, friction over the abdomen daily with 1℥ of soap liniment and ½℥ of the compound tinct. of aloes has been found to regulate the action of the bowels.

In some cases the symptoms attending the efforts for the expulsion of solidified fæces are quite alarming; the child becomes entirely prostrated from frequent forcible straining; under such circumstances, if an injection fails to give relief, it becomes necessary to employ mechanical means for the removal of the obstruction; where the scybalous condition is not so formidable, a teaspoonful of castor oil, followed in a short time by the injection of warm water or gruel, will suffice for its dislodgement.

Dentition will very frequently excite sympathetic disturbances of the respiratory apparatus, and most frequent among these we notice coryza or simple catarrh, or inflammation of the mucous membrane of the nares; it is a troublesome and annoying affection, but can rarely be considered dangerous. Dr. Meigs believes that the chief dangers arise from the filling up of the nostrils with a plug of dried viscid mucus, or the occurrence of submucous infiltration, causing the sides of the nasal cavity to collapse.

Hence the treatment usually consists simply in the administration of some cathartic, as a few grains of calomel followed by castor oil, carefully cleansing the nostrils, and anointing their surfaces with glycerin, almond oil, cucumber ointment, etc., to prevent the drying and adherence of the discharge, and protect the adjoining parts from excoriation.

I believe it very rare that tracheitis, pleuritis, pneumonia, etc. can be justly attributed to dentition; in my limited experience I recall no such instance, yet we are satisfied that a cause incapable of originating such diseases, is unquestionably capable of their maintenance, and hence as a contributing excitant, it will not unfrequently merit attention, and its relief constitute an important link in the chain of ameliorative or curative agencies.

Laryngeal catarrh, occasioned or aggravated by dentition, may penetrate the Eustachian tube, and through continuity of membranous investment, occasion catarrh of the internal or even external ear and profuse otirrhœa, which it becomes useless to combat prior to the removal of the cause;—in the same way the extension of a nasal catarrh through the naso-lachrymal duct may implicate the conjunctiva,

and produce a diseased condition of the eye; and it is very frequently the fault of a practitioner to medicate local manifestations topically without the exercise of a closer scrutiny, which might discover to him the *cause.*

Disordered dentition may call into existence a diseased condition of the *skin,* and no organ presents a greater variety of appearances under morbid influence, whence the origin of an extended and complicated list of names, many suggested by some trivial and unimportant difference in the character of the eruption.

This multiplication of varieties has led to an unnecessary mystification of the subject, and from its magnitude, tries the patience, and defeats the effort to familiarize its details. It is but reasonable to suppose that a tissue like the skin, protected during fœtal life from all external influences, and suddenly called into unaccustomed action and subjected to atmospheric and mechanical influences, should be particularly prone to manifestations of disease.

When we reflect that the skin forms an extended absorbing and eliminating surface, intimately correlated with various other functions, and even in the adult constitutes a mirror in which are reflected many of the symptoms which guide the practitioner in medicating internal affections, why, with its greater vascularity and irritability in infancy, should it not afford even a closer and more delicate sympathetic index of remote disorders, including the irritation consequent upon abnormal dentition?

I am aware that these facts have been adduced as arguments to prove that, since skin diseases are dependent upon so many and such slight causes, it becomes ridiculous to impute to dentition any agency in their production. Now, while I am free to admit that they are more frequently traceable to other influences, it does not seem impossible, nay, it seems more than plausible, that abnormal dentition, which, as we have already learned, is by no means a universally unimportant affection, should occasionally exhibit its peripheral complications in the tissues of the skin. Why, if skin disorders originate from such a multitude of mild excitants, should not dentition, which has been derisively dubbed an unimportant nothing, occasionally at least attain such an aggravated form as to reach the level of a mild predisposing or exciting cause? I am as little in unison with those who underrate its importance as with those who would so magnify its bearings as to torture into dependency every pathological condition occurring during the progress of its beautiful and important phenomena.

Without entering into superfluous and bewildering detail, we will simply notice the four forms of skin disease occurring mostly during dentition, and considered as frequently dependent thereon.

Strophulus.—"An eruption of pimples appearing first upon the face,

neck, shoulders, hands, and arms, but occasionally on other parts of the body." It has been termed red or white gum, according to the color manifested, and when concomitant with dentition is known by the name of "tooth rash."

It presents as a few irregularly distributed pimples, occasionally mixed with diffused patches of redness, but when found directly dependent upon oral irritation, the pimples are of firmer consistence, occur in patches, with considerable redness, and are more generally diffused over different parts of the body.

It is generally a harmless manifestation, and is even believed by some to prove conservative in protecting from disease the lungs or alimentary surfaces; occasionally it gives rise to considerable irritation or itching, the scratching thus provoked aggravating rather than alleviating the trouble.

The rash, though subsiding with the subsidence of the prime source of irritation, is liable to reproduction with each successive tooth, and where dentition is rapid, may continue to a greater or less extent through the entire period.

The treatment consists in the removal of dental irritation, a regulation of the diet, fresh air, the occasional administration of an aperient, and the use of the warm bath; where there is accompanying it considerable febrile excitement, minute doses of calomel, ipecac., and nitre in combination, are suggested as beneficial. To relieve the itching, the surface may be bathed with any bland fluid, as bran tea, infusion of slippery elm, or sassafras pith.

Prurigo is an eruption of pimples less distinct and flatter than those of strophulus, and confined to the outer surface of the limbs and trunk.

As the name implies, it is accompanied with intolerable itching, which is greatly enhanced by the warmth of the clothing; the scratching ruptures the pimples, which exude a transparent or bloody fluid, and this accumulating upon the surface forms thin crusts of a brown or black color.

The same treatment as that just mentioned is found applicable. After the removal of the cause, an emetic, followed by a mild cathartic and good diet, will often abort its progress, could the scratching and rubbing of the surface be obviated; to accomplish this the hand may be muffled, and the surface bathed with some mucilaginous wash or a watery solution of opium. The extract of belladonna or ointments of sulphur have been advised in inveterate cases.

Crustea Lactea—"Generally occurs upon some part of the face, especially upon the cheeks, and it is more frequent during dentition than at any other period." It usually commences in one or more distinct red blotches, which become studded with numerous small, yellow-

ish pustules, nearly confluent, and attended with considerable itching, and preceded and accompanied in severe cases by some degree of erysipelatous inflammation." At the end of three or four days, and sometimes earlier, the pustules burst and discharge their contents, which dry upon the skin and form semi-transparent and friable crusts. The discharge continues from under the scab, which keeps increasing in thickness.

The incrustations may be isolated or confluent, and in bad cases may cover the entire face as with a mask; after the lapse of three or four weeks they become detached, and leave beneath a red, shining, and very tender surface, which, upon slight irritation, is liable to reproduce the disease.

The matter oozing from beneath the scabs seems to possess some degree of acrimony, for it excites in healthy tissues with which it comes in contact, whether of the child or its attendants, a condition resembling the original affection in being a pustular eruption, and terminating in superficial ulceration. No marks are left after the continuity of the diseased surface is finally renewed.

The treatment is to all intents and purposes the same as that mentioned for the other varieties of skin disease; in lymphatic temperaments, however, the prolongation of the disease may dictate the exhibition of mineral or vegetable tonics for the support of the general strength, as the lactate or tartrate of iron, infusion of bark, gentian, cascarilla, or columbo.

Impetigo.—"An incrustation of an umber, sienna-brown or olive color, appearing either in defined patches or scattered over the surface."

The eruption occurs in the form of minute pustules clustered together or dispersed, usually upon the upper or lower extremities; they appear either upon an inflamed surface or in groups, with a defined inflamed margin; when thus gathered together, the discharge becomes inspissated, and presents appearances similar to those observed in crustea lactea.

In some instances it becomes so extended as to envelop the entire limb, even eventuating in the destruction and loss of the nails, and impeding and completely preventing the motions of the member.

The crusts may separate and the disease commence declining as early as the second or third week, while it may be indefinitely prolonged, and, under unfavorable circumstances, lead to the involvement of the subcutaneous cellular tissue, which constitutes a complication of severity and danger.

In mild cases a mercurial purgative, followed by oil, magnesia, or magnesia and precip. sulphur, with the local applications previously suggested, and an unirritating diet, will usually suffice for the correction of the disorder.

When the local inflammation is severe or extensive, local blood-letting

by leeches, saline cathartics, and cloths soaked in liq. plumb. acet. dil., are the measures suggested.

To quiet the irritation a few drops of tinct. of hyoscyamus may be given two or three times a day.

When the disease is more severe, we are recommended, as a good local application, to apply upon a linen cloth a mixture of acid hydrocyanic, aqua destil. and alcohol.

In the most obstinate cases the system may need the support which is afforded by the tonics previously named; advantage will also accrue from the internal use of sulphur or sulphuret of potassa, 5 to 10 grains three times a day in milk, the decoction of dulcamara, and the external use of sulphur, or sulphur vapor baths.

These skin affections enumerated constitute the principal ones occurring during dentition, and frequently attributable thereto, and without further complication of the subject, we may conclude their consideration with the statement that the similarity of treatment pertaining to these four characterizes the entire list.

(To be continued.)

THIRD DENTITION.

BY J. K. DODGE, WEST EAU CLAIRE, WIS.

Two cases of third dentition have lately come to my notice, which may be of interest to the profession. One was that of a lady of 48 years, who had her teeth taken out eight months since, and who now has a right superior cuspid erupting, and I think there are signs of others. The second case was that of a daughter of the first, aged 18, who had her teeth taken out some six months since; a right superior cuspid appeared, which I extracted. These are interesting cases, happening the same to both mother and daughter.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

(Meeting of February 3d, 1869. Continued from page 143.)

The evening discussion was now declared to be in order, and the Secretary announced the subject, as chosen at the last meeting, to be "The Indiscriminate Extraction of Teeth." Without attempting to present all that was said, it is sufficient to say that the discussion was very generally participated in by the members present.

All united in the expression of the duty of the dentist to be, that he should leave no proper means untried to save the dental organs. The great importance of these structures in the economy of nature was dwelt upon, and was considered to be evident, from their position at the entrance to the mouth, the extreme beauty of form and structure that nature has lavished upon them, and the high degree of sensibility with which they are endowed, being very properly styled, "tactile organs of the mouth." Indeed, but few organs are more essential to the health and well-being of man, whether he be savage or civilized. The eye, with its tender coats, is hardly more sensitive than the dental pulps, and branches of the same nerve that assist in forming these, supply that organ with general sensibility. King John of England well knew how to present to the Israelite of Bristol the necessity of a speedy acquiescence and submission to the unjust demand of a corrupt sovereign, by causing his teeth to be extracted.

The tendency of the present day seems to be toward erroneous interpretations of the will of Divine Providence, as shown by the acts of the poor unfortunates who have been so miserable as to be the victims of odontalgia; the pains suffered under these afflictions are by many considered to be warnings that these organs should be extracted. Consequently, when the inducements of painless extraction and cheap artificial substitutes are held out, there cannot be much astonishment expressed at the readiness with which those who are ignorant of the value will part with their most useful and best friends, believing that, by so doing, they are ridding themselves of a pestering enemy.

How little, in this enlightened nineteenth century, do the majority really know of the loss sustained by the drawing of a single tooth! It may not be too figurative to say that this is the opening of the breach, through whose blood-stained boundaries the stealthy enemy may enter, and, by the wiles—the tricks—the undermining, and the disaffection which he spreads, secure an easy victory for death over life. From the mound made over the fallen heroes of the defense, the enemy may mount until the walls of the citadel are carried, and the black pall is spread over the remains.

The want of the means to properly masticate food has no doubt been a fruitful source of evil to the American people. To the ill-advised services of the ignorant dentist, much will be laid that is now, from a want of sufficiently far-seeing examination, erroneously set down as caused by consumption, consequent upon dyspepsia; forgetting, as we do, that this which we call the cause, may be merely the effect of undue gastric labor over unmasticated or improper nutriment.

The subject was divided into the consideration of the injury inflicted

upon the individual and his posterity. The former may suffer first, from the inconvenience of an imperfectly developed arch of the teeth, or irregularity of the second dentition resulting from the premature and hasty interference of the extractor. Probably but few dentists have escaped from the trouble of treating irregularities for the miserable children who, during their tender years, have been unfortunate enough to be put under the careless hands of these pretenders. It may be said that one of the most fruitful causes of contraction of the arch and misplacement of the teeth of Americans, is due to the fact that people often are induced to allow themselves to be robbed of the teeth which nature has intended should be retained, but the tooth-puller, who, without even the education or time bestowed upon the art, that is required of the most simple artisan, has decided to tear out. The act is none the less injurious in its results if the patient's sensibility is benumbed by an anæsthetic; the deformity will as surely supervene.

What a matter of surprise and astonishment it becomes to contemplate the intelligent, free American citizen, who with his just pride in his country's success, to which he believes he personally contributes and to which he hopes to see his children add their store, placing those same hopefuls, from whom he thinks the future Presidents are to be selected, in the chair of a man who has served less time in acquiring his knowledge than the coachman who drives his horses, or the barber who makes his toilet.

The second calamity, to which this barbarous practice subjects the individual, may be the result of the first—namely, the impairment of the functions of the teeth, by the manner in which they are arranged, and the early loss of the permanent teeth, or the same trouble may come from the way in which the painless extraction of aching teeth is held up and the cheap substitutes lauded by those whose pecuniary interest leads them to be guilty of that which, although not a crime under the statute laws, it is none the less to be deplored that men are ready and willing to commit. Without having the organs of mastication in their normal condition, the undue labor upon other parts may be considered as certain in its ruinous effect, and the skill of both the dentist and physician will not cure the sufferer.

Of the injury done to posterity, the conclusion may be readily drawn from the strong resemblance which children bear to their parents in their external appearance; it is natural to infer that their internal structures may be more or less moulded after the progenitor; and if the bones which support the features must partake of the same shape, why should not the teeth? The practical experience of every dentist proves that the teeth are no exception to the rule, and it is frequently as easy to discover the relationship of children by this likeness as by the physiognomy, or color of the eyes and hair.

When this fact is contemplated, how great the responsibility to those who have, or anticipate entering into, married relations; since the neglect of their own health will entail their defects and deformities upon their unborn offspring. Although the child of parents who have lost their teeth may not be doomed to edentulous gums, any more than that it should be born without arms or legs, because these are missing in the parent, still we always look for defects of organs to be inherited.

The regular monthly meeting was held on Wednesday, March 3d, 1869, at the Philadelphia Dental College building, No. 108 N. 10th St. The President in the chair.

Minutes of previous meetings were read and approved.

The Curator called the attention of the Society to a specimen of the superior maxillary bones and teeth of a sheep's-head fish; this exhibited an incisor tooth partially erupted over another: it was presented by E. H. Neall, D.D.S. There was also a superior cuspid tooth from Dr. T. L. Beers, of Morrison, Ill., which from the want of a proper history of the case was of but little value, although a peculiar formation of the root evidently made it a curiosity.

The subject of "The Relative Merits of Clasps and Atmospheric Pressure for retaining Partial Plates" was taken up.

Dr. Moffit, who first spoke, said that he would be guided by the positions of the teeth, of the two maxillæ, when occluded. If the lower protrude and artificial teeth are mounted on suction plate, the leverage may be too great, and thus interfere with the use of the case for mastication.

Sometimes it is impossible to obtain accurate impressions; the natural teeth being formed much larger at the crowns than around the neck, they will draw the material used for taking impressions, or cause it to be broken so as to prevent a perfect model of the mouth being made; then we may be compelled to use clasps.

He had found a brace to be of service, where there was a tendency in the plate to tilt or drop at the back; this he arranged so as to come in contact with the posterior surface of the natural molars, and thus counteract on the force applied to the plate by the biting.

In fifteen years' practice, he had not known of one, two, or three incisors mounted on suction plate that would perfectly answer the purpose of mastication; he thought but few cases could be successful except where a bicuspid or molar was attached to the plate.

Dr. Harris' whole experience has been against the adjustment of plates by means of bands around the remaining teeth; whether wide or narrow, the same results are produced. A degree of irritation is set up, softening, loss of tooth structure, and eventually of the teeth, supervene. Happily, as the profession advanced, the atmospheric pressure came to

its aid. This gentleman had for years supported single teeth upon suction plates, and he thought that, if even retained by silk ligatures, the same consequences as from the use of the metal clasps would result, from the accumulation of food, its consequent decomposition, and general interference with the healthy functions of the teeth.

He had seen the teeth worn by Washington, a set of both upper and under, each adjusted by simply a half-round wire with spiral springs. From the time these were constructed to the present, a gradual increase in the width of plates has been made, until now the whole roof of the mouth is covered, adding much to the comfort of the individual and the usefulness of the denture.

Another point to which he wished to call attention was, that as the absorption of bone progressed, the plate receded, and the lateral pressure of the bands very frequently raised the natural teeth from their sockets, thus first impairing their use, and finally causing their entire loss.

Although there is at times much more inconvenience occasioned, at first, by the introduction of atmospheric plates, than by those attached with clasps, the recollection that "patience and perseverance overcome all obstacles," may encourage the wearer to persist and thus surmount the difficulty of retaining the former. He narrated a case where the death of a husband had caused the wife to forget the minor trouble occasioned by a plate, and before she was aware of it the artificial teeth had become a great comfort. Sometimes the dentist is subject to sad disappointments. He remembered one of his own that seemed worth giving. A lady, who had worn a narrow plate for several years, had suffered so much of a change in her mouth, from the absorption of the alveolar processes, that the plate would never have been supposed, from its appearance, to have been made for her; one end actually riding across the alveolar ridge, caused the cheek to protrude as if wearing a plumper on that side. He very naturally concluded, that if such an inconvenient piece had been put up with, anything approximating to a correctly made denture might readily be worn. To his surprise, upon having neatly adjusted a properly constructed set, the first exclamation made was, "Don't you see I can't wear these teeth!"

The doctor thought that sometimes irritation of the soft parts is occasioned by the continual exhaustion of the air from the cavity of the plate; but this is more easily cured, than we can replace the loss of structure or loosening of the teeth when bands have to be kept upon them. This was not presented as a theory, but as facts observed during an experience of thirty-five years as a practitioner.

In conclusion, he expressed his views to be, that to obtain correct adjustments of plates to the mouth is a very delicate operation, and probably the most annoying of all the duties of the dentist are met with in

the mechanical work; he hoped the two branches, this and operative, would soon be separated, as it certainly would be a great relief to many.

Dr. Nones deemed it always advisable to use the atmospheric pressure; sometimes the plates may not be readily retained without clasps, particularly when being used in the process of mastication. The peculiarities of each case were so numerous that he always considered them, and generally allowed this to govern his actions.

Dr. Long noticed a remark made by a writer in last month's DENTAL COSMOS, that "no intelligent dentist would insert teeth in any other way than on a suction plate;" did not approve of such sweeping assertions; knew quite a number of very intelligent dentists who used clasps to secure the plate, when the case seemed to require it; had often seen the decay of teeth caused by badly-fitting clasps and by want of cleanliness, the patient allowing food to remain under them; thought the best plan to make a neatly-fitting clasp was to press a piece of well-annealed platina around the model of the tooth, and melt upon it scraps of gold.

There were some objections to the air chambers in plates, from their tendency to work forward, as any one knows who has made a number of sets for the same patient; the edge of the chamber will be in danger of impinging upon the anterior palatal canal, causing severe pain by pressure upon the nerves. To avoid this, it is best to place the cavity as far back as possible. He preferred plates without chamber, depending upon accuracy of fit to hold them in position, but seldom found patients willing to dispense with the extra anchor for their "false substitutes." Although advocating that method for the insertion of artificial teeth, he rarely practices it; finding, as Shakspeare makes Portia say, that he "can easier teach twenty what were good to be done, than to be one of the twenty to follow mine own teaching."

Dr. Howard thought that, by giving a decisive preference for either of the methods, he should place himself in a fort from which he had no retreat; and, to make the best of it, would most likely be compelled to succumb to the powers which had a free range. He had met with cases that struck him with astonishment, not being able to account for their adhesion; these were small plates, composed of either silver or gold, extending upon the roof of the mouth as far as the rugæ are found, and longitudinally or circumferentially from cuspid to cuspid, right and left; held originally with clasps, but now by nothing but the perfection of adaptation. This he thought settled the problem. To obtain satisfaction from the beginning cannot be invariably accomplished in partial cases, without the use of a stay clasp or springing of the plate with force about the palatine or labial necks of the teeth. Therefore he concluded by saying that both clasps and atmospheric pressure are good, yet neither should nor can be made obsolete.

Dr. Stellwagen had inserted single teeth upon suction plates, and found

them to answer well for all the purposes required, although subjected to rigid tests. He thought clasps should only be used after the atmospheric pressure was found to be inadequate to meet all the requirements. He often met parties able to wear plates from which the clasps had been broken, yet prior to that accident the patient had deemed them essential to comfort and success in wearing.

Prof. Smith thought the subject under consideration to be one of great practical importance, affecting as it does the appearance and comfort of a very considerable number of patients, while often taxing the skill and jeopardizing the reputation of the dentist. A matter of so much moment demands careful study, and requires that in forming conclusions, we be assisted by sound judgment and practical experience. Very opposite opinions have been expressed this evening as to the efficiency and utility of the different modes of applying partial dentures—some claiming that in no case can an artificial piece be retained in the mouth by other means than atmospheric pressure, without positive injury to the natural teeth; others giving as the result of their trials that from one to three of the oral teeth inserted without the aid of clasps, cannot be retained in the mouth during the process of mastication. Speaking from his own observation, he could not acquiesce in the views presented by either side. He would go neither to the one extreme nor the other, but stand upon middle ground; this he believed most emphatically a tenable position, sustained by facts and the teachings of everyday practice. While in most cases his preference would be for suction plates, yet he unhesitatingly discarded the theory of necessitated and positive injury from every form of clasped denture.

English dentists, for more than half a century, have used partial plates clasped, almost exclusively; their testimony is not such as to lead to utter condemnation, but rather to a continuance of the usage. Much injury has unquestionably been done to the natural teeth by clasps; but he believed that in almost every instance it could be directly traced to the neglect or want of cleanliness on the part of the patient; to the injudicious selection of natural organs to which to apply them; to the improper form of the support, or the want of adaptation. If our American students were as thoroughly schooled in the manipulations pertaining to dental mechanism as the English are, he believed far less mischief would be observed from clasped plates. There is too great a tendency to confound as synonymous, in these days of the reign of cheap materials, the ability to adjust a set of section teeth on a base of rubber, and mechanical dentistry. It is here, in a want of knowledge of the principles of mechanical dentistry, that we find the source of evil from clasped plates; just in proportion as we understand these principles, and by nice manipulation are able to put them in practice, will we diminish the injury to the natural teeth

from the use of bands. This style, when well adjusted, will need a clasp only to steady it; its *main* support being from accuracy of adaptation to the parts upon which it rests. Often, very often, plates are formed and clasps adjusted in such a manner as to compel them to do *all* the work of sustaining the piece. Where such is the case, detriment to the natural organs must be the result.

Classes of teeth entirely unsuited for such a purpose are not infrequently selected as supports for partial cases. He had often seen clasps about the cuspid teeth, and in one or two instances about central incisors.

That a clasped plate necessitated the absorption of the processes about the natural teeth more than a suction plate would do, he believed to be without foundation in fact. In regard to a clasp about a natural tooth interfering with its normal condition, as a string embracing muscular tissue interferes with its functions, he thought we had no evidence to justify us in concluding. The damage which is done to a tooth he conceived to be purely external, and when the plate is properly formed and the clasps nicely adjusted, there is little danger from this source. A marked want of attention to the cleanliness of the piece, assisting the mechanical action of the clasp, may be, and doubtless is, a prolific source of harm.

While he believed the clasping of partial cases, in the present condition of dental prosthesis, to be decidedly *good* practice, he nevertheless discarded the view that suction plates cannot be made to answer where the teeth had no antagonists. He felt no hesitation in inserting from one to six oral teeth on suction plates, when such a course seems most in harmony with the requirements of the case; had a number of such in his own practice, and had seen them from the hands of various gentlemen in the profession.

An objection urged against suction plates for partial cases, was the difficulty of obtaining a perfect impression in wax. He recommended plaster: where there is liability of displacing the wax in withdrawing from the mouth, it is the material to meet the demands; it does not draw but breaks, and in such a manner as to preclude the possibility of getting it into any position but the correct one when adjusting the broken pieces. The cup may be detached from the plaster in the mouth, then cut, if hot, so as to break in a manner to best facilitate removal. One of the most valuable properties of plaster as an impression material is its quality of resisting displacement, when set, without breaking. With plaster, as perfect an impression of the mouth can be obtained for a partial as for an entire case.

In regard to chambers, he was satisfied that the very best form of suction plates were those without them; as commonly made they are too deep. A shallow cavity is far more efficient than a deep one, as the part is only put upon the stretch, while the deep is soon filled, often

with an indurated mass, which renders it worse than useless. Prof. Smith called attention to the spring plates patented by E. B. Goodall, of New Hampshire, and explained the manner of constructing. Objection being raised to this method because of the patent, he confessed his inability to understand why a professional man, simply because he is such, should be debarred from protecting an invention by legally obtaining a patent, while the mechanic is applauded for such a course.

He considered mechanical dentistry, so called, by far the most perplexing department of dentistry, requiring for its intelligent practice an extended range of experience and information. He hailed with open arms any discovery or invention, patent or otherwise, that would assist in securing more certain and satisfactory results than have yet been reached in this branch.

Prof. McQuillen said that his experience with regard to mechanical dentistry had been so limited of late years that it might appear almost presumptuous for him to express an opinion on the subject, but he could not refrain from stating that he had known of several instances in which one or two teeth, attached to suction plates, had been worn with comfort and advantage for years by patients who had come under his care. He recalled in particular two sisters, one of whom lost a central, the other a central and a lateral incisor, which were replaced by artificial teeth, so perfectly adapted, and secured by atmospheric pressure, in each instance, that only a very critical eye could distinguish them from the natural organs. The adhesion of the plates to the roof of the mouth was such as to demand some force to dislodge them. While making this statement, he fully recognized that cases are frequently presented to the practitioner in which suction plates could not succeed (owing, however, more to mental than physical difficulties) and in which bands would be absolutely indispensable. The maladaptation of bands was calculated to abrade the teeth, cause decay, and loosen them, but when properly adjusted, for patients who are careful to use the tooth-brush, these injurious results do not supervene, even when such plates have been worn for many years.

Dr. Moffit had received a circular from the "Spring Plate Company," and he had examined some of the work; but did not see how it could be used without eventually spreading the arch of the teeth, in which case it could not be retained. The action of this style of plate would be the same as some of the appliances for treating irregularity where the arch is contracted. He thought there would be more mechanical than chemical action causing the abrasion of teeth where clasps are used, owing to the constant motion of the plate.

Dr. W. H. Trueman inquired what was claimed as original in the patent spring plate,—the idea of retaining them in position by pressure upon the natural teeth in the manner described, or the application of rubber

to that particular form of plate? If the former, it is no novelty. He had seen gold and silver plates made upon precisely the same principle, pressing upon from one to four teeth on each side, ten or twelve years ago. The idea was an old one then. He had seen rubber plates retained in the mouth by the same means. They answered very well for a short time, but the teeth would spread. Nearly if not all the spring plates he had made, sooner or later came back, either to be replaced by new, or to have bands extended around the teeth. Some few lasted three or four years. He could see no difference between them and the usual form of regulating plate made for the purpose of expanding the arch. To be retained in place, there must be pressure upon the teeth, and this pressure will move them—a fact admitted by the gentleman *claiming* to be the inventor. He tells us in a recent article upon the subject, that, "if the plate bears too hard upon one tooth, it will move out so as to equalize the pressure on all the teeth," and then goes on to say something about widening the arch a little, treating it as a small matter. What is to stop this action from continuing as long as the pressure exists? It is true, it is not so rapid when acting on three or four as on one. These teeth being constantly held out of place, a deposit of bone around their fangs will render the deformity permanent, especially in young patients. He did not think the interlocking of the cusps during mastication could be depended upon to prevent this; at least it had not done so when they were formerly in use. He believed the adaptation of artificial teeth, especially partial sets, required the constant exercise of judgment; had, within the last week, met with a case on gold, nearly a full upper, which had given perfect satisfaction fifteen years, and to all appearances was likely to continue useful fifteen more, which was held up, or at least depended for support, upon a clasp of heavy half-round wire thrown around a wisdom tooth, and made to touch on only two opposite points; every time the patient closed the mouth, the plate was pressed up and oscillated upon these two points. In this case the motion was unavoidable; the dentist who made it showed his judgment in making provision for it. The only visible injury was a slight depression where the band pressed. He had no doubt if the band had been made to fit, as the books tell us they always should, *accurately*, and an effort had been made to prevent this motion, the tooth would have gone long ago.

As a general rule, he preferred to make clasped cases for *men*, and suction plates for *women*. The latter in most cases have a decided advantage, but men as a rule will not be bothered with them. They want something they can put in their mouths and use without any "getting used to." Ladies, on the contrary (the side they are mostly on), have more patience, more perseverance, and their tongues being so much more active and accommodating, it don't take them so long to feel at home with a plate in their way. He very often puts little stay bands on

plates, so as to hold them until the patient becomes accustomed to and learns how to manage them; then he cuts them off. When the integuments are soft and flabby, the plates will sometimes cut up into them and produce serious irritation; half-round wire on the edge generally gives relief in such cases. He thought the injury to clasped teeth was more a chemical than a mechanical action. He had no faith in the idea suggested, to allow the saliva free access between the band and tooth; cleanliness on the part of the patient is the all-important preventive. The standard clasp had perhaps some little advantage, but could seldom be used. He had seen a perfect groove worn in a tooth by gilling twine used in regulating cases, undoubtedly by chemical action, as mechanical abrasion in this case was impossible. The extreme sensitiveness at the neck of the tooth, he thought due to the fact that at this spot the cementum and enamel, each brought to a thin edge, unite often without lapping over, leaving in many cases the dentine poorly protected. This can readily be seen with the naked eye—better with the microscope, by making a longitudinal section of a canine or incisor.

Prof. McQuillen then called the attention of the members to the effect produced by the direct application of chloroform, by means of a soft camel's-hair brush, to the cerebellum of a pigeon. The result was an impairment of the function of co-ordination, which was made more evident by removing a small portion of the nervous matter and applying the anæsthetic agent in the centre of the mass, thus having more surface acted upon.

On motion, it was resolved that the Treasurer be requested to furnish to the Recording Secretary a list of delinquents, so that he should enter upon the notices to members the amounts due.

Dr. Harris accepted the appointment as essayist for the next meeting, and named as his subject "The Past, Present, and Future of Dentistry."

Adjourned to meet on the first Wednesday in April (7th).

NEW YORK STATE DENTAL SOCIETY.

The adjourned meeting of the New York State Dental Society was held in Albany during the first week in February, and was well attended, very harmonious, and eminently important in its results, giving great promise for its future.

The organization was fully perfected by the adoption of a full set of by-laws and code of ethics.

The president read an inaugural address, giving a concise history of the rise and progress of dentistry in the United States, showing the rapid advancement made during the nineteenth century, and that from the absence of proper restrictions many were entering upon its practice,

without going through a proper course of education; that the ranks of the dental profession were now swollen to such magnitude that the time had evidently arrived when some legal barrier should be raised, and a higher degree of qualification demanded, for the protection of the public, and the salvation of such important organs as the teeth. The State Legislature, on the 7th of April, 1868, passed a law to regulate the practice of dentistry, and for the organization of dental societies, which will prove of great benefit, although inadequate to bring about a full reform. It is certain that any body of professional or scientific men are better judges of the qualifications of those engaged in their particular calling than the public at large, and that each profession, especially in those branches of science pertaining to health, should be left to govern its own members.

Dr. John Allen, of New York, read a paper on artificial dentures, which evinced great research, and was eminently practical, showing what could be accomplished in the perfect restoration of the contour of the face and the natural expression, the loss of which necessarily results from the loss of the teeth

Prof. N. W. Kingsley, of the New York College of Dentistry, read a short paper on dental art, introductory to an extempore lecture, illustrated by a series of crayon sketches on canvas, and also demonstrated in one case on the human subject, showing what wonderful changes may take place in the human face divine by the loss or restoration of the teeth. The doctor entered upon an entirely new field in physiology, and evinced himself the true artist that he is.

The State Medical Society, being in session at this time, sent in a resolution to the Dental Society, expressing their cordial approbation and countenance in the steps taken for the elevation and advancement of dental and medical science.

It may not be generally known to the public that, in conformity to the above-named dental law, a district society has been formed in each of the eight judicial districts of the State, and also the State Dental Society, which is composed of eight delegates from each of the district societies, permanent members elected by the State Society from eminent dentists in this State, and honorary members from other States or countries.

OFFICERS.

President—Dr. A. Westcott, Syracuse.
Vice-President—Dr. W. B. Hurd, Brooklyn.
Secretary—Dr. L. W. Rogers, Utica.
Treasurer—Dr. B. T. Whitney, Buffalo.

The board of censors is composed of—1*st District*—Dr. J. G. Ambler, New York; 2*d District*—Dr. W. B. Hurd, Brooklyn; 3*d District*

—Dr. Alexander Nelson, Albany; *4th District*—Dr. Z. Cotton, Cambridge; *5th District*—Dr. A. Westcott, Syracuse; *6th District*—Dr. R. Walker, Owego; *7th District*—Dr. F. French, Rochester; *8th District*—Dr. R. G. Snow, Buffalo.

A full set of delegates was appointed to the American Dental Association, which is to meet at Saratoga on the first Tuesday of August; also, Dr. J. G. Ambler, of New York, as delegate to the Dental Society of the State of Pennsylvania; Dr. George E. Hayes, of Buffalo, delegate to the Ohio State Dental Society; and Dr. B. T. Whitney, of Buffalo, delegate to the Dental Association of Ontario, Canada.

It is now very important that every dentist should connect himself with his district society, and thus bring himself within the pale of the law, and also make application to the Board of Censors of the State Society for a diploma, or to the censors of his district society for a license.

The annual meeting will be held on the last Tuesday in July.

BOSTON DENTAL INSTITUTE.

The annual meeting of the Boston Dental Institute was held at the rooms of the Boston Dental College on Monday, the 4th day of January, 1869, at 10 o'clock A.M.

The following were elected officers of the Society for the present year: *President*—Dr. D. G. Williams. *First Vice-President*—Dr. M. Newton. *Second Vice-President*—Dr. A. M. Dudley. *Recording Secretary*—J. B. Coolidge, M.D. *Corresponding Secretary*—D. S. Dickerman, D.D.S. *Treasurer*—Dr. G. B. Harriman. *Librarian*—B. T. Currier, D.D.S.

Board of Censors.—Dr. Isaac Ayling, Wilkes Allen, D.D.S., Dr. S. R. Adams, Dr. D. F. Drake, J. C. Skinner, M.D., and Dr. A. J. Smith.

The regular meetings of the Institute occur in Boston on the first Tuesday of each month. There are at present seventy-five active members. The Society is now having a course of lectures from Prof. Rufus King Browne, on "Anatomy and Physiology," every Saturday evening.

D. S. Dickerman, *Cor. Secretary.*

BALTIMORE COLLEGE OF DENTAL SURGERY.

The twenty-ninth annual commencement of the Baltimore College of Dental Surgery was held on Wednesday evening, March 3d, in the Concordia Opera House, which was filled with a large and fashionable audience.

The exercises commenced with prayer by the Rev. Dr. W. E. Munsey, after which the authority of the college for conferring the degrees was

read by the Dean, Professor F. J. S. Gorgas, who also announced the names of the graduates.

The degree of Doctor of Dental Surgery was then conferred upon the following gentlemen composing the graduating class, twenty-six in number, by Professor Gorgas:

C. L. G. Becht, M.D.	Holland.
Alonzo G. Bouton	Georgia.
David C. Card, M.D.	Connecticut.
James A. Chapman	Virginia.
Abner F. Claywell	Tennessee.
Thomas C. Edwards	Tennessee.
Reuben K. George	Virginia.
John P. H. Grant	Tennessee.
Charles E. Hammen	Virginia.
A. Frank Herr	Pennsylvania.
James B. Hodgkin	Virginia.
Jacob Z. Hoffer	Pennsylvania.
George F. Keesee	Virginia.
Benjamin F. Kid	Virginia.
George H. Kirk, Jr	Alabama.
William E. Norris	Maryland.
Joseph N. Rentch	West Virginia.
John W. Scribner	Virginia.
E. F. Shuler	Mississippi.
John C. Storey, M.D.	Virginia.
Singleton Townsend	Maryland.
Luther Trump	Maryland.
W. W. Westmoreland	Alabama.
Richard B. Winder	Virginia.
George H. Winkler	South Carolina.
Judson B. Wood	Virginia.

The valedictory address was delivered by Professor E. Lloyd Howard, M.D., and the students' address by Dr. Geo. F. Keesee, a member of the graduating class. The late Professor Piggot was to have delivered the valedictory address, and some fragments which he had prepared a short time previous to his death were read by Professor Thos. E. Bond, who also paid a feeling tribute to the memory of the deceased.

The audience was dismissed with the benediction by the Rev. Dr. Munsey.

The faculty and students wore crape upon their left arm as a mark of respect to the late Professor Piggot.

The number of matriculants during the session was sixty-four.

DENTAL SCHOOL OF HARVARD UNIVERSITY.

The annual commencement of the Dental School of Harvard University, Cambridge, Mass., took place on Wednesday, March 10th, 1869.

The address was delivered by Prof. Edward H. Clarke, M.D.

The number of matriculants for the session was fifteen.

The degree of Doctor of Dental Medicine was conferred upon the following graduates, by Henry J. Bigelow, M.D., Professor of Surgery and Clinical Surgery:

NAME.	RESIDENCE.	THESIS.
R. Tanner Freeman	Washington, D. C.	Importance of Preserving the Teeth.
Thomas Fillebrown	Lewiston, Me.	Non-assimilation of Food as a Cause of Impaired Dentition.
Thomas Haley	Biddeford, Me.	Dental Caries.
Edward Page	Charlestown, Mass.	Nitrous Oxide.
Samuel J. Shaw	Marlboro', Mass.	Extracting Teeth.
Joseph J. Vincent	Amherst, Mass.	Dental Manipulations.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The thirteenth annual commencement of the Pennsylvania College of Dental Surgery was held at the Musical Fund Hall, Philadelphia, on Saturday evening, February 27th, 1869.

The valedictory address was delivered by G. T. Barker, D.D.S., Professor of Dental Pathology and Therapeutics.

The number of matriculants for the session was eighty.

The degree of D.D.S. was conferred on the following graduates:

NAME.	RESIDENCE.	THESIS.
G. W. Adams	Pennsylvania	Extraction.
Wm. N. Baumgartner	Maryland	Inflammation.
H. D. Bennett	Illinois	Inflammation of Pulp. [Sinus.
A. L. Betancourt	Cuba	Diseases of the Antrum or Maxillary
Jacob E. Brecht	Pennsylvania	Indigestion. [tistry.
B. Climenson	Pennsylvania	The Use of Baser Metals in Den-
J. P. Crowell	California	Caries, Physiological and Hygienic
John W. Crymes	South Carolina	Inflammation. [View.
J. H. Downes	Pennsylvania	Inflammation.
R. R. Freeman	Tennessee	History of Dentistry. [2d Dentition.
Henrietta Hirschfeld.	Prussia	Treatment of Children during 1st &
S. H. Linn	Pennsylvania	Anæsthesia.
Lorenzo J. Martin	Cuba	Scorbutus.
Thomas J. Mitchell	North Carolina	Extraction of Teeth.
T. S. Muygridge	Washing'n Territory	Dental Caries.
J. W. Moore	Pennsylvania	Digestion.
A. E. Peyrellade	Cuba	Dentition.
J. E. Register	Maryland	Dentistry *vs.* Medicine.
W. H. Roop	Pennsylvania	Facial Neuralgia. [thetics.
C. Rohland	Pennsylvania	The Physiological Action of Anæs-
B. L. Taylor	Minnesota	Dental Etiquette. [ties.
S. B. Tizzard	Ohio	Treatment and Filling of Pulp Cavi-
F. R. Thomas	Pennsylvania	Administration of Nitrous Oxide.
D. Van Buskirk	Pennsylvania	Morbid Secretion of Mouth.

Graduates who have been in Practice since 1852.

Robert Russell	Tennessee.	G. A. Haines	Maine.
A. J. Young	New Hampshire.	H. Gerhart	Pennsylvania.

MISSOURI DENTAL COLLEGE.

The third annual commencement of the Missouri Dental College took place on the 8th inst. at Polytechnic Hall, St. Louis. The valedictory was delivered by Prof. J. S. B. Alleyne, and the students' address by Henry Fisher.

The names of the graduates are as follows:

H. L. Hewitt	Missouri.	Edward Ehmann	Germany.
R. J. Porre	"	R. H. Winsbrough	Arkansas.
J. P. Wilson	Iowa.	W. A. Jones	Missouri.
Edgar Park	Missouri.	Henry Fisher	"
A. B. Carey	Illinois.	L. F. Prince	"
A. W. Morrison	Missouri.	Michael Corcoran	"

The number of matriculants for the course of lectures this session was twenty-two.

PHILADELPHIA DENTAL COLLEGE.

The sixth annual commencement of the Philadelphia Dental College was held at Horticultural Hall, Philadelphia, February 26th, 1869.

The valedictory address was delivered by Harrison Allen, M.D., Professor of Anatomy and Surgery.

The number of matriculants for the session was fifty-two.

The degree of D.D.S. was conferred on the following graduates:

NAME.	RESIDENCE.	THESIS.
Paul Emilio Besse	Cuba	Hemorrhage.
James A. Blum	North Carolina	Extraction of Teeth.
Alonzo Boice	New York	The Noble Metals.
H. Edmond Casgrain	Canada	The Nervous System.
James M. Caufman	Pennsylvania	Filling Teeth.
Alfred C. Cogswell	Nova Scotia	First Molars.
Varnum D. Collins	China	Temperaments.
Brooke Davis	Pennsylvania	Filling Teeth.
Henry N. Dodge, M.D.	New York	The Necessity of Accurate Observation in the Study of Dental Science.
Luis Estrada	Cuba	Alimentary Canal.
Joseph Holmes	Ohio	The Treatment of Teeth with Pulp dead.
Henry M. Humphrey	Massachusetts	Digestion.
Absalom M. Jarrett	West Virginia	Pyogenic Membrane.
Henry W. Ladd	Maine	Congestion.
Oscar P. Macalaster	Nova Scotia	First Dentition.
Isaac N. McCuddy	Kentucky	First Dentition.
Newton Morgan	Massachusetts	Respiration.
Judson N. Niles	Vermont	Dental Prosthesis.
Benjamin Percival, Jr.	Massachusetts	Chemistry.
Adolf Petermann	Germany	Analysis of the Blood.
Charles E. Pike	Maine	Food and its Conversion into Tissue.
Albert J. Snead	Virginia	Impressions.
Mordaunt Stevens	France	Surgical Cleft Palate.
Thomas G. Wardle	Pennsylvania	Digestion.
Henry M. Welch	New York	Inflammation.

NEW ORLEANS DENTAL COLLEGE.

The second annual commencement of the New Orleans Dental College was held at the residence of Dr. Kells, No. 14 Dauphine Street, New Orleans, La., on Wednesday evening, March 17th, 1869.

The valedictory was delivered by Dr. J. Wilbur Angell.

The number of matriculants for the session was fourteen.

Diplomas were awarded to the following graduates by Dr. Jas. S. Knapp, Dean of the College:

J. Wilbur Angell	Texas.	Paul Humbert	Louisiana.
Ernest J. Bienvenu	Louisiana.	Peter L. Ulmer	Alabama.
Geo. H. Carpenter	"	*John R. Walker	Louisiana.
Joseph Bauer	"	*Jas. West	"
Alonzo A. Dillehay	"		

* Not graduates, but diplomas awarded, as being qualified by experience and skill.

EDITORIAL.

GYNÆCOLOGICAL SOCIETY OF BOSTON.

An association with the above name has been recently established in Boston, for the advancement of Gynæcic Science and Art (or the study and treatment of the diseases of women), and their due recognition both in Boston and throughout the country. The members are to consist of active, honorary, and corresponding; the active members never to exceed twenty-five in number. The officers for the ensuing year are Winslow Lewis, M.D., President; Horatio R. Storer, M.D., Secretary George H. Bixby, M.D., Treasurer.

The formation of this society is in keeping with the tendency of our age, and, particularly in America, toward special fields of labor in the vast domain of medicine. Although this segregation of practice has been opposed by some men of prominence, the benefits arising from it have been so well marked and conclusive, that no unbiased mind can do otherwise than commend such course of procedure.

J. H. McQ.

DENTAL COLLEGE COMMENCEMENTS.*

In this number of the magazine is presented as usual, so far as furnished, the number of students in attendance upon the lectures, and lists of the graduates from the dental colleges in the different cities of our country. As year after year new colleges have been established, the number of students taking advantage of the opportunities for a collegiate education has materially increased, as will be found by comparing the reports of two annual commencements in the April number of the Dental Cosmos for 1860 with those for this year; a brief interval of only nine years, during which our country has been engaged in other than peaceful pursuits.

1860.	MATRICULANTS.	GRADUATES.
Baltimore College of Dental Surgery	71	39
Pennsylvania College of Dental Surgery	51	21
Total	122	60
1869.		
Baltimore College of Dental Surgery. Twenty-ninth annual session	64	26
Pennsylvania College of Dental Surgery. Thirteenth annual session	80	24
Philadelphia Dental College. Sixth annual session	52	25
New York College of Dental Surgery. Third annual session	31	12
Missouri Dental College. Third annual session	22	12
Dental School of Harvard University. First annual session	15	6
New Orleans Dental College	14	9
Total	278	114

* Elsewhere we give a condensation of the commencement exercises of all the colleges which we have been able to procure.

It will be observed that, although the foregoing does not include the Ohio and Boston Dental Colleges, from which we have not as yet heard, the students this year have been more than double (and probably treble) what they were nine years ago, and in Philadelphia alone the number of students in attendance upon lectures has been greater than the combined classes of the two colleges reported in 1860.

In connection with this it is a source of gratulation that the high estimate placed upon American dentistry abroad has induced students from various quarters of the globe to seek our shores for the collegiate education which they could not secure at home. Thus we are enabled to pay back, through our profession, some of the obligations which the New World is under to the Old.

In conclusion, the only reliable and legitimate course for educational institutions to adopt, to command the confidence and secure the unqualified support of the profession, is for the individual members of the faculties to demonstrate clearly and unmistakably to their students the capacity and disposition *to labor earnestly and effectually* in their behalf. Let this be once fully recognized, and it matters not where the institutions are located, their ultimate success is certain; and as a desirable article always commands a market, students who value their time, money, and the opportunities afforded them, will not ask if the institutions are located in the North, the South, the East, or the West, but whether the faculties are *competent to teach the science and art of dentistry* in a manner that will enable them to practice with benefit to the community and to their own advantage.

J. H. McQ.

BIBLIOGRAPHICAL.

The Mechanical Treatment of the Deformities of the Mouth, Congenital and Accidental. By Robert Ramsay and James Oakley Coles. London: John Churchill & Sons, New Burlington Street. 1868.

A neat volume of 95 pages on this important subject, illustrated by a large number of well executed wood-cuts, has been received from the publishers. The contents embrace a description of the Origin and Development of Congenital Cleft Palate; the Theory of its Transmission from Parent to Offspring; the Anatomy and Physiology of the Deformity (taken from the work of Sir William Fergusson); Troubles arising from the Affection, *i.e.* Difficulty of Sucking, Defective Speech, etc.; Appliances used from A. D. 1552 to the Present Time; Methods of taking Impressions; the Various Stages of the Construction of Artificial Vela and their Adaptation to the Mouth; the Subsequent Training to overcome Impediments of Speech and secure Distinct Articulation; closing with an account of the Treatment of Six Cases of Congenital Cleft Palate.

The great improvements which have been made during the past few years in the construction of artificial vela are referred to, and credit given to Stearn, Sercombe, Kingsley, Bogue, and others, for their labors in this direction.

Prepared as this work has been to meet the demands of the dental and medical practitioner (no monograph on the subject having appeared since the publication of Snell's in 1828), we take pleasure in commending it as a valuable, and therefore desirable, treatise to possess. It is a matter of regret that a monograph on this subject has not already appeared in America from the pen of Prof. Kingsley, who has devoted so much time and attention to, and made such decided improvements in, this department of mechanical dentistry as to permanently identify his name with it.

J. H. McQ.

On the Formation and Arrangement of a Dental Museum, with a proposed Dental Classification of the Placental Mammalia. By Robt. T. Hulme, M.R.C.S.

A pamphlet of seventy odd pages has been received from the author, containing many excellent suggestions relative to the arrangement of a Dental Museum, and much valuable information on the Comparative Anatomy of the Teeth, and the important place they occupy in the classification of animated nature on the part of the zoologist. A number of wood-cuts are scattered through the pamphlet, and serve to illustrate the text in a satisfactory manner. It is to be hoped that the author of this modest pamphlet will elaborate a theme which he treats in such an instructive and agreeable manner, and in due course of time present to the profession an extended treatise on this important subject.

J. H. McQ.

OBITUARY.

Died, at his residence, Chatham, Ontario, Canada, on Friday, 22d January, 1869, of consumption, Dr. William Wilmot White, dentist, fourth son of the late George White, Esq., Kingston, Ont., in the 40th year of his age.

He had been ten years in practice in Chatham, but for the past two years had been unable to attend to the duties of his profession in consequence of failing health.

By his many amiable qualities he had gained many warm friends, who sincerely deplore his death. He leaves a wife and three children to mourn the loss of a kind and affectionate protector.

I cannot do better than quote the concluding portion of a notice of his demise in a Chatham paper:

"He was a patient sufferer through a protracted illness, and gently fell asleep, cheered by a sure hope of resurrection and everlasting life." C.

CORRESPONDENCE.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA RELATIVE TO REYNOLDS' PATENT.

Readers of the Dental Cosmos will see by the record of the proceedings of this Society, that at its meeting on the 5th ult. specimens of my improvement were exhibited before that body. This was done without my sanction. Mistaken zeal for the success of my efforts on the part of those to whom these specimens were committed for another object, has led to this premature proceeding. It was not my wish that this course should be taken until circulars explanatory of the advantages of my method, now thoroughly tested for upwards of a year, should appear, or until I might be able in person to bring it properly forward during the ensuing spring.

It is creditable to the Society that the unworthy suggestion thrown out at the close of the discussion met with no response. The silent rebuke will, it is hoped, admonish individuals to be cautious how they infringe upon rights vested in others. It will be my duty to review, *seriatim*, the arguments advanced in the debate, as well as the line of argument adopted.

Columbia, S. C., Feb. 22d, 1869. WM. REYNOLDS.

SELECTIONS.

CLEFT PALATE.

Extract from a Clinical Lecture delivered at the Massachusetts Medical College, Harvard University, December 21, 1868, by Henry J. Bigelow, M.D., Professor of Surgery.

[Reported by Henry H. A. Beach, M.D.]

"In showing a plaster cast of a cleft palate recently operated upon, I would direct attention to a mechanical expedient for aiding union of the palate in the operation of staphyloraphy, first employed, so far as I know, in this case. Before doing so, it may be well briefly to review this deformity and the operation for its relief. The cleft may be median or lateral. It is either a continuation of a hare-lip, or exists independently. In the latter case it may involve both the hard and soft palate; or only the soft palate may be affected—and in cases very favorable for operation, to an inconsiderable degree. The result of this deformity is chiefly noticed in the nasal intonation of the voice, to correct which various expedients have been proposed. The name of the late Dr. J. Mason Warren is associated in this community with many of our earlier operations, and I think that to him is fairly due the original suggestion of freely liberating the soft palate by dissecting it from its upper attachments, before drawing together the margins thus liberated. This is perhaps the great improvement of the modern operation.

"I am not aware that Dr. Warren described the anatomy of the parts

thus detached. This was afterward done by Mr. (now Sir) Wm. Fergusson, who, examining the cleft palate of a dead child, showed that this malformation involved a contraction of the levator palati, and sometimes other muscles. I do not know that this distinguished surgeon detached the flaps in a way which practically differed from that repeatedly accomplished by Dr. Warren, but having described anatomically the parts thus dissected, his name is associated with this feature of the modern operation. The late Dr. Warren was impressed with the belief that a large majority if not all the subjects of this operation were materially improved, if not cured of their nasal voice. A case of my own, fifteen or more years ago, led me to scrutinize this point more narrowly, and I was led to the conviction that although a patient occasionally shows a remarkable improvement in speech, the rule is the other way. Neither can improvement be always expected at once, but only after a lapse of sufficient time to allow the parts to become flexible. The case I have just alluded to was that of a young lady, in whom the nasal intonation was very marked, and in whom the only apparent deformity of the palate was a partial cleft of the uvula alone. The palate was ample, and to appearance well under muscular control, and yet this congenital deformity of a bifid uvula was associated with some imperfection in the mechanism of articulation, which months of efforts on her part, even after the fissure was closed by the operation, failed to overcome. This case established the fact that something is wanting for perfect articulation beyond a palate of normal size and appearance ; and that although the lateral flaps of a cleft in the soft palate may be attached to each other, often with a result beautiful in appearance, it does not therefore follow that the nervous and muscular action will be perfectly restored. In the case of a wide fissure extending well forward through the bone, the parts are actually insufficient to restore the palate, and then the usual result of the common operation is a band of greater or less width tightly stretched by cicatricial contraction across the palate, bounded behind by a naso-pharyngeal chasm which it is insufficient to close, and in front by a fissure in the bone which still remains. It is difficult to say that the phonation of such patients is not improved a little; they are, indeed, generally inclined to flatter themselves with this belief after an obturator has been adjusted to the bony opening. A patient with palatine fissure, in articulating the words *bad man*, says *man man*, vainly trying by facial distortion to occlude the anterior nares; while a patient with nares occluded by a tumor, or a cold in the head, says *bad bad* or *beautiful bood*, as in the familiar poetry of *Punch*. Between the nasals *m*, *n*, and *ng*, on the one hand, and the labials *p*, *b*, the linguals *t*, *d*, and the gutturals (improperly so called) *k* and *g* hard, made with the occluded nares, on the other hand, there is a wide difference; and perfect articulation requires the machinery for enunciating, at will, both sets of consonants. This the healthy palate supplies in opening and hermetically closing the posterior nares. Yet there are persons with sound palates who habitually talk through the nose, as the conventional Yankee is said to do. Such persons do not make efficient use of their levator palati and superior constrictor of the pharynx. While we may hope to approximate our patients to the normal condition of such persons, it should be remembered that a very small communication with the nasal fossæ may materially modify the intonation. The nasal quack of the duck, for example, is produced by the reverberation of a compara-

tively small elastic cavity; and a hole in the human palate a quarter of an inch or even less in diameter, may produce the same result. It cannot be denied, however, that a very marked improvement now and then results from this operation, especially in a favorable case; and in view of this possibility it is certain that patients will continue to demand it at the hands of the surgeon.

"The expedient to facilitate union, before alluded to, consists in the employment of a temporary artificial palate, in this instance of hard rubber, to protect the parts during cicatrization. Its use was suggested to me by Dr. Beach as a means of shielding the tongue from metallic sutures, and thereby enabling the surgeon to employ them conveniently during this operation. It also occurred to me that this arrangement would protect the palate from the peristaltic action of the tongue in swallowing, and other involuntary movements which endanger union. It is pretty well established that the success of the modern operation for vesico-vaginal fistula mainly depends upon the use of metallic sutures planted close together, so as to insure close contact of the wound, with an irritation so inconsiderable that they can be left in place from one to two weeks. Similar advantage ought to accrue from their use in the palate. The hard rubber palate here shown was made by Dr. Shepard, Adjunct Professor in the Dental School of this University, and fitted so as to cover the whole region occupied by the palate after the operation. It conforms with the arch of the normal palate, leaving an interval of about a quarter of an inch between it and the mucous membrane. Behind, it bends down just far enough not to incommode the tongue, while in front it was in this case keyed in the interstice of the incisors left by the former hare-lip, and laterally attached by a string to a tooth on each side. The whole is made as accurately as if it were a plate for false teeth. A hole near the front admits the nose of a small syringe, by which the interval between the plate and palate was syringed with warm water twice daily. In this case, I cannot doubt that this contrivance was of service. The fissure was wide, reaching forward to the incisors. The flaps were detached well forward from the bone, and seven fine silver stitches were inserted. The plate was not removed for the examination of the parts until the eighth day, when every stitch was found in place and was removed, the union being perfect. During the succeeding week the contracting cicatrices at the margin of the wide fissure of the bony palate drew apart a quarter of an inch of the anterior extremity of the wound, which is less than usual in these cases. The width of the remaining band was about one inch and a quarter, which, considering the size of the palate, is more than we could have expected. I cannot but think that whatever be the operation upon the palate, a more perfect union will be secured by silver sutures thus protected than by the ordinary method.

"It remains to notice some of the expedients which have been of late years adopted in connection with this operation. One of the most valuable of these is the so-called 'gag' of Mr. T. Smith, of London, a steel instrument by which the jaws are admirably kept open, and the tongue at the same time depressed, so that the parts are fully exposed, and the operation can be performed with great facility under ether, even in young subjects. This one, imported by Dr. Hodges, has been fully tested in the operations of staphyloraphy, excision of tonsils, etc., with ether, during the past few months at the Massachusetts General Hospital, and the operation above alluded to was done with its assistance.

"Much attention has been directed to the different methods of closing the openings behind and in front of the transverse band of varying width which results from the union of the soft palate in large fissures. This has been usually effected with an obturator. I have not met with as good results as many writers claim to have obtained, by an operation which consists in simply detaching the soft tissue from the bony margins of the anterior fissure. Of this tissue Langenbeck says that it is 'more fragile and more adherent to the periosteum as we approach the gums; in fact, you can only borrow autoplastic flaps with a chance of success from the posterior part of the mucous membrane, the thickest and least adherent, especially that which covers the horizontal plates of the palatine bones.' But there can be little doubt that by detaching this flap we secure a union of the soft palate to a point a little further forward than might otherwise be possible, and so facilitate the subsequent use of an obturator. A later operation, usually attributed to Langenbeck, is said to be much more effectual in closing the anterior fissure. It consists in denuding the whole horizontal bony palate, and uniting the soft tissue thus detached upon the median line. A good idea of this operation may be obtained by supposing two large lateral flaps to be thus formed, from the whole soft and hard palate combined. The tissue is best detached from the bony palate by square or spade-pointed blades inclined to their handles, by which the tough tissue is cleanly dug or hoed from the bone. After starting it, blunt instruments work best. Such flaps are still insufficient, anteriorly, and a lateral incision is therefore made on each side, close to the alveolar processes from the second incisor nearly to the last molar. These incisions stop in front, at the incisors, and behind near the hamular processes, in both cases before reaching the bony canals of the arteries. Thus the arteries of the flaps are preserved, before and behind, and the flaps are wholly detached from the horizontal bone, except at these three points; the anterior attachment being a pedicle. These incisions are usually made first, and the process of detaching the soft parts is there begun and continued inward toward the median line. When the fissure is wide, and one or both sides of the bony palate vertical, the lateral incisions may not be needed. The anterior fissure thus occluded by obturator or membrane, can have no immediate influence in bad cases upon the pharyngeal opening; although it is quite probable that after a lapse of time the flexible membrane will insure a more flexible soft palate and a better phonation than an unyielding obturator.

"M. Passavant, of Frankfort, in a paper on the means of obviating the nasal intonation in congenital fissures of the bony and membranous palate, etc. (*Arch. Gén. de Méd.*, 1865), after alluding to the inefficiency of present operations to attain this result in a majority of cases, cites a case of much improvement after an operation in which the posterior border of the soft palate was attached to the pharynx behind it, the surfaces being first denuded and then placed firmly in contact by means of sutures. This result, however, was only attained at the expense of a transverse incision of the soft palate, by the gaping of which the palate was brought into contact with the pharynx. I ought here to add that, within a few months, I have attempted this operation in one instance without liberating the soft palate by a transverse incision, and that in this instance the pharyngeal border failed to unite. But it seems not improbable that these and other comparatively recent investigations

will lead to some operation to be performed under ether (with the invaluable aid of the dilator above mentioned), which may so far occlude the nasal cavity or shut it off from that of the mouth by a flexible septum, as to insure in bad cases an improvement of the voice, which now only occasionally results from the operation in such cases. It is probable that the hard and soft rubber palate, alleged to afford relief in these cases without operation, would be even more efficient as the results of surgical interference become more complete.

"It remains only to describe the common operation. If ether is not to be used, the patient should educate the soft palate to insensibility for a few days by frequently tickling it with a feather. The best way to hold the soft palate for dissection is with double hooks terminating in firm single points, meeting and crossing a little. A single puncture is thus made. Forceps slip, tear and bruise the parts. I divide the muscles until the flaps are free, with scissors doubly curved, on the edge and flat, one for each side, passing the finger occasionally behind the flap, to find what is most tense and unyielding. The edges are now to be pared; this incision bleeds less, and is therefore perhaps best done first. The whole thickness of the edges of the palate should be denuded, and if there be doubt upon this point, owing to the discoloration of the parts, the detached silver may be floated in water to see if it is of uniform width. Further dissection may be made before or behind at discretion, and the parts brought together by common small curved needles threaded with silk or wire; then each suture, to facilitate finding it again, has its ends united, and each is drawn in succession through the fissures of a plate or cork, cut like a comb and held on the forehead of the patient. The best needle-holder should have jaws not a quarter of an inch wide, that they may not straighten a curved needle, and not extending half an inch beyond the pivot, that the long handles may secure a firm grip of the needle. The best needles are the smaller sizes of glovers' needle, curved with different bends, the temper being then partially restored and their convex surface flattened by grinding or honing, to prevent them from turning in the forceps. The silk sutures are now tied with common knots; or the wires with a half knot and then a twist, and are to be left in place until union, or as long as they are of any service."—(*Boston Medical and Surgical Journal.*)

ON THE IDENTITY OF THE WHITE CORPUSCLES OF THE BLOOD WITH THE SALIVARY, PUS, AND MUCOUS CORPUSCLES.

BY JOSEPH G. RICHARDSON, M.D.,
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"The nature of the nucleated corpuscles so abundant in the saliva has long been a subject of some uncertainty, and although they have probably, as favorite test objects for the higher powers, been more frequently examined by microscopists than almost any other constituent of the glandular secretions, observers seem to have been generally contented to accept them simply as useful measures for the capacity of the higher objectives, and passed on without any attempts to solve the mystery of their origin; Kölliker, indeed, advanced the theory that they were essentially a form of exudation corpuscles, but hitherto his hypothesis does not appear to have been generally accepted by microscopists as a fixed fact.

"The following experiments, undertaken to elucidate their constitution, were performed with the large Powell & Lealand's instrument, so long a denizen of the 'Microscope Room' in the Pennsylvania Hospital, and no doubt endeared by constant association to many generations of 'Residents,' as well as to myself. When it was discarded by the Institution, I became the purchaser, and after undergoing some repairs, and having adapted to it a $\frac{1}{25}$th inch objective (made by Mr. William Wales, of Fort Lee, N. J.), it has accomplished the work below described.

"The salivary corpuscles examined under a power of eleven hundred diameters present the appearance of perfect spheres, varying from the $\frac{1}{1400}$th to the $\frac{1}{2500}$th of an inch in diameter, each having a very transparent but beautifully defined cell-wall of exceeding tenuity, which incloses from one to four almost equally transparent nuclei of a circular or oval form, whose diameters range from $\frac{1}{3000}$th to $\frac{1}{4000}$th of an inch. These nuclei are situated sometimes centrally, but more commonly near one side of the corpuscle, and the cavity between the margin and the cell-wall is generally filled with from 25 to 50 molecules, not more than $\frac{1}{20000}$th of an inch in diameter, whose characteristic is that of constant and rapid motion. Some of these molecules seem to be elongated into an oval or hour-glass form, but the activity of their movements renders it difficult to ascertain this with precision. In my observations these corpuscles have appeared to enlarge and become flattened, from the pressure of the glass cover, as the stratum of liquid beneath became thinner from marginal desiccation, so that usually in the course of an hour or so they burst, and discharge about one-fourth of their contents, when two, three, or more of the molecules swim away, continuing their revolving movements until they pass out of view; the other granules outside and those remaining within the cell become in a very few seconds entirely stationary. If a solution of aniline red, of the strength of one grain to the ounce of distilled water, be allowed to penetrate at the margin of the cover, the nuclei of the salivary corpuscle are readily stained of a bright crimson, and are thus exhibited with beautiful distinctness; the dye appears, however, to exert an immediate influence upon the movement of the molecules, as I have rarely been able to find cells in which they continued to move after the nuclei became at all colored.

"In examining some urine, obtained on the 8th of August, 1868, near my late residence, in Western New York, from a patient who complained of severe pain in the kidneys and bladder, I was surprised to find that a deposit, which appeared to the naked eye purulent, was chiefly composed of cells, exactly resembling in form, size, definite cell-wall, contained nuclei, and actively revolving molecules, the salivary corpuscles with which I had become so familiar; and should have imagined that these proceeded from an accidental adulteration with sputum, had I not been fortunate enough to have ocular demonstration to the contrary when procuring the specimen. I examined these corpuscles repeatedly in the course of the two following days, during which the movements of the molecules continued, but could make nothing else of them except drawings, which I carefully preserved.

"On consulting the text-books to which I had access, I found that neither Beale, Roberts, Bird, nor Naubauer and Vogel, in their works on the Urine, mentioned cells such as those above described, although the editors of the Micrographic Dictionary, in their description of the

salivary corpuscles, state that they have seen them by myriads in the renal secretion; nevertheless, numerous specimens examined during the following few months, seldom without special scrutiny for similar bodies, afforded none, until in a deposit occurring from urine brought me by a medical friend about December 1st, the corpuscles I had so long been in search of were at last recognized, and on this occasion I was able to exhibit them to several microscopists—among others to my friend, Dr. H. C. Wood, Jr., Professor of Botany in the University of Pennsylvania.

"On the 5th of December, I procured a sample of urine from a case of cystitis, which had only been passed a few hours, and on placing it under the field of the $\frac{1}{25}$th, I found many of the pus-globules exhibiting the amœbaform movements described by Dr. Beale in his late elaborate work on the 'Microscope in Practical Medicine;' no corpuscles containing moving molecules were visible, but observing that some of the pus-cells having a spherical outline were almost opaque and only about $\frac{1}{3000}$th of an inch in diameter, it occurred to me that they were perhaps only contracted by the exosmose of their fluid contents into the surrounding denser medium, and the idea suggested itself to try the effect of diminishing the specific gravity of the urine by the addition of water. Under this treatment I found that the cells which had been exhibiting amœbaform movements, soon assumed a spherical shape, rapidly enlarged until they reached the diameter of about $\frac{1}{1700}$th of an inch, when the contained molecules began to revolve, and ere long took upon themselves the extremely rapid and confused movements which I had twice before seen in cells occurring in urine, and hundreds of times in the salivary corpuscles; the action of aniline solution rendered beautifully distinct definite nuclei similar to those found in the salivary bodies.

"The opportunity of corroborating the interesting and remarkable researches of Dr. Cohnheim, of Berlin, on the identity of the pus and white blood corpuscles thus obviously presenting itself, I proceeded with the following experiments. Drawing a drop of blood from the tip of my finger upon a 'growing slide,' I covered it with thin glass and placed it upon the stage of the microscope. After finding a white blood corpuscle showing well-marked granules, I raised the objective, and arranged a fine filament of thread from the reservoir filled with fresh water to the upper edge of the cover, and a fragment of wet paper to the lower, according to the usual method for securing a constant current beneath the thin glass. On depressing the body of the instrument and bringing the corpuscle again into view, I found it still adhering to the surface of the cover, notwithstanding the torrent of red globules hurrying over the field, and as these became paler and less distinct by reason of the diminished density of the serum, the white cell first gradually expanded and displayed its delicate wall with two rounded nuclei; then, after acquiring the magnitude of about $\frac{1}{1700}$th of an inch, it exhibited the rapid and incessant movement of its contained molecules, and finally, when its diameter reached about $\frac{1}{1400}$th of an inch, it burst suddenly, discharging a portion of its contents, whose outbreak resembled that of a swarm of bees from a hive, and some particles of which, actively revolving as they went, swam off to the confines of the field. On repeating the observation and allowing some of the aniline solution to flow in with the water after the first few minutes, the nuclei were strongly stained and rendered beautifully dis-

tinct, although the movement of the molecules promptly ceased, in this respect as in all the others showing a precise identity with the reactions afforded by the pus and the salivary corpuscles, as above described. It should be noted that a certain variable proportion of the white cells of the blood thus treated exhibited no moving molecules, and *apparently* consisted solely of nucleus and cell-wall.

"It is worthy of remark that this experiment amply demonstrates the inestimable advantages of high objectives (which some even yet pretend to doubt), for the remarkable movement of the contained molecules seems to have escaped the attention of Prof. Virchow, the great author of 'The Cellular Pathology,' himself (*vide* p. 181, Chance's translation, 1863). Although the observation was first made with the aid of a $\frac{1}{25}$th, yet *afterward*, knowing exactly what to look for, I had little difficulty in demonstrating to various gentlemen the revolving molecules thus brought into view with powers as low as the $\frac{1}{8}$th inch.

"A portion of fetid pus from an abscess, and a specimen of mucus from the nasal fossa, under a like treatment, gave similar results, which did not materially vary in numerous trials.

"Tracing now the white blood corpuscle from its condition of irregular outline and amœbaform movement, as observed in serum and in heavy urine, when the circumambient fluid approaches the density of 1028, through its rounded form with slightly more distinct nuclei, in the liquor puris, and in urine of lower specific gravity, we find that immersed in a rarer liquid, approximating to the mean density of the saliva (1005), it has an accurately spherical outline, is more than twice the magnitude, and contains a number of minute actively moving molecules, thus exactly resembling in all sensible characters the true salivary corpuscle; and it therefore seems reasonably certain that the blood, under the appointed nervous influence, congesting the buccal mucous membrane and associated glands, moves slowly enough through their capillaries to allow some of its white globules to penetrate the walls of the vessels, as they are said to do those of the frog's mesentery in Cohnheim's experiment (Virchow, Archiv, Band 40, S. 38, u. s. w.), which, under the influence of the rarer saliva, expanding them and setting free to move their contained molecules, constitutes the bodies so long known to histologists as the corpuscles of the salivary fluid.

"Dr. Lionel Beale, in his work on the 'Microscope in Practical Medicine,' remarks in reference to the examination of the saliva: 'In the somewhat viscid matter of which the salivary corpuscle is composed, are multitudes of highly refracting particles in incessant motion. The nature of these particles is extremely doubtful. They look very like the germs of bacteria, and it is possible they may be of this nature.' If the hypothesis thus guardedly indorsed by the celebrated English microscopist be correct, it seems not improbable that the white corpuscles, either in the capillaries or lymphatic glands, collect during their amœbaform movements those germs of bacteria which my own experiments (*American Journal of the Medical Sciences*, July, 1868) indicate always exist in the blood to a greater or less amount. And further, it appears not impossible that when thus loaded, their elimination through the saliva, under the mercurial influence, and their evacuation by a discharge of pus from a seton or a tartar emetic ulcer, really constitute that therapeutic value of these remedial measures in certain cases which has so long rested unexplained."—(*Pennsylvania Hospital Reports.*)

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Origin of Species and Nature of Life.*—We showed in a former article that Professor Owen is no votary of the Divinity of Chance. On the contrary, he believes that, as every individual animal passes through a succession of forms—embryonic, infantine, adult, and aged—so each group of similar animals descended from common parents, which we call 'species,' has an innate and foreordained tendency to deviate from the parental type, and to produce new forms of a more specialized character. 'A purposive route of development and change, of correlation and interdependence, manifesting intelligent Will, is as determinable in the succession of races as in the development and organization of the individual. Generations do not vary accidentally in any and every direction, but in preordained, definite, and correlated courses.'*

"And as with the coming in of new species, so with the extinction of old ones; if the one cannot be believed to be due to fresh acts of miraculous creation, so must the other not be considered due to occasional cataclysm or convulsion, but to the steady operation of law. One cause of extinction recognized by Professor Owen is defeat in the struggle for existence. In 1850 he had shown this, when he said that, in a dry season, the large mammal will suffer from the drought sooner than the small one; if food be scanty, the large one will perish before the small one; if new enemies be introduced, the larger and more conspicuous will be the earlier victims; and smaller animals are, as a rule, more prolific than large ones.

"This view of the rule of extinction, he says, 'has received a large and most instructive accession of illustrations from the extensive knowledge and devoted labors of Charles Darwin.' It is, in fact, so far as we can see, the same rule which Mr. Darwin subsequently propounded on the same subject. But it must not be for a moment imagined that Professor Owen is an adherent of the 'Darwinian theory.' What he claims is, that he enounced before Darwin the doctrine of extinction by law, which is all that he thinks sound in the Darwinian theory; while he utterly repudiates Darwin's endeavor to explain the 'origin of species' by 'natural selection.' Owen shows how easy of refutation and ridicule were parts of Lamarck's theory and his illustrations thereof; but with ineffable sarcasm he rebukes those who have ridiculed Lamarck—'the great and philosophic naturalist, bearing calmly and nobly an old age of blindness and poverty'—without giving him the credit of having truly set forth 'the stable grounds of a derivative origin of species, unity of plan, geological epochs, successive species therein'—while nothing of Lamarck's seems more extravagant than Darwin's notion of the black bear swimming about in the water catching insects in his enormous gaping mouth, and so in time becoming 'a creature as monstrous as a whale.' * * * *

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† "In other words, new species are 'preordained departures from parental type, probably sudden and seemingly monstrous, but adapting the progeny inheriting such modifications to higher purposes.'"

"Professor Owen sums up the contrast between his own theory of 'Derivation' and Darwin's theory of 'Natural Selection' in few words, which we thus venture to abridge. 'Derivation' holds that each species changes in time by virtue of inherent tendencies. 'Natural Selection' holds that this is effected by altered external circumstances. 'Derivation' sees the purpose of the Creator in the variety and beauty of creation, and the adaptation of each member of it to others, and especially man, a being capable of appreciating beauty. 'Natural Selection' feels that 'if ornament or beauty in itself should be a purpose in creation, it would be absolutely fatal to it as an hypothesis.' 'Natural Selection' leaves the origin and succession of species to the fortuitous concurrence of outward conditions. 'Derivation' recognizes purpose.

"Professor Owen next comes to the consideration of the origin of life itself, and discusses first the doctrine of *evolution*, according to which the embryo exists ready formed, though in a state of inconceivable minuteness, in the body of its parent, and it is by a series of expansions and disencasings that it grows to the adult form.

"Secondly comes the doctrine which affirms *omne vivum ex ovo* or *omnis cellula e cellula*, and which supposes that life was at first once for all miraculously breathed into certain organic forms, and that every subsequent offspring is the result of the self-division or proliferation of living elements, which, 'when properly nourished, again multiply by self-division, and grow to the likeness of the parent cells.'

"Doctrines such as these Owen treats as ancient phantoms which still haunt some chambers of the physiological mansion, while they afford him the opportunity of setting his heel upon the latest aspects of Darwinism; and if we may formulize his valuation of this now popular theory, it is to the effect that all that is sound in Darwinism was Owen's, and all that was not Owen's is worthless. 'Those,' he says, 'who still hold by the rag of the "pre-existence of germs" call all organic corpuscles or granules "cell gemmules," and maintain that they are transmitted, sometimes becoming developed, sometimes lying dormant from generation to generation, independent, autonomous, pre-existing from their primeval miraculous creation, as descendants, like all higher forms of life of that one form of "Natural Selection" into which life was first breathed. Darwin grafts upon this modification of the old evolutional dogma his provisional hypothesis of "Pangenesis."'

"It follows from the above that Professor Owen, dismissing the old doctrines as absurd, and Darwin's pangenesis as absurder, believes to the full in what has been called 'spontaneous generation,' or the incessant new development of living beings out of non-living material. He sides with Pouchet and Child against Pasteur. He does not believe in 'panspermism,' or the doctrine that all the forms of life produced in decaying organic matter come from germs dispersed through the air. He prefers believing that, when the requisite material and conditions are present, other forces are resolved into vital force; and sees 'the grandeur of creative power,' not in the exceptional miracle of one or few original forms of life, but in the 'daily and hourly calling into life many forms by conversion of chemical and physical into vital modes of force.' The 'CAUSE which has endowed His world with power convertible into magnetic, electric, thermotic, and other forms or modes of force, has also added the conditions of conversion into the vital mode.' 'Change of force forms part of the constitution of the Kosmos.'

"We will not follow Professor Owen minutely in the comparison which

he draws between life and magnetism, and between all the actions of living beings, from the attraction of the amœba by a bit of meat to the highest phenomena of consciousness in man; of which his conclusion is that from the magnet which chooses between steel and zinc to the philosopher who chooses between good and evil the difference is one of degree, not of kind, and that there is no need to assume a special miracle to account for mental phenomena.

"We find Professor Owen's conclusions on some of the higher relations of life to be contrary to the doctrines instilled with most religious teaching, though he urges that if he unsettles any man's faith, 'he knows that what he has to impart lends better and truer support both to the faith and the hope.' Of course he rejects the notion of a vital principle as a distinct certainty. The 'soul' is the personified sum of psychological manifestations; it is no more independent of the brain than the spark is of the galvanic battery. 'If,' he says, 'the physiologist rejects the theological sense of the term "life," without giving rise to the charge of unsoundness in religious principles, does he lay himself more open to the charge by rejecting also the theologian's meaning of the term "spirit," of the term "soul," of the term "mind," and, we might add, of "sin" or "death"?' If we read him aright, 'soul' is absolutely non-existent, except as an abstract conception; and it were as rational to treat of a 'soul' as a real being, as of the performance of a watch, as though it were something existing apart from a watch.

"Although these ideas must fairly be called materialistic, and openly oppose the notion of an 'immaterial, indestructible soul,' yet nothing can be further from Professor Owen's doctrines than the *low* materialism which sees law without a lawgiver, force without author, and no God apart from matter. It must be remembered in the first place that Professor Owen's ideas of life necessitate the belief in the perpetual presence and working of a personal God, the Lord and Giver of life; that he believes in a future life and resurrection and judgment of the dead, 'on the ground of their being parts of a Divine revelation;' and that he shows (and quotes the history of the Witch of Endor and of the doubting Apostle Thomas to exemplify it) that we really are in no condition to say what is material and what immaterial. We only know of force and its effects, but (as Faraday said) as for what causes these effects we get nothing by defining them as material or immaterial. For our own parts, we must not wander into the ground of dogmatic faith, but as regards reasonable opinion, we must say that Professor Owen's own doctrines tell quite as much for the existence of an immortal soul as not; that the results of force must be as indestructible as matter, save by the will of God, and soul is one mode of force; and, if the matter be doubtful, we ourselves are not ashamed to be biased by the spiritual instincts of universal man, and to say, with the pagan philosopher, 'Si in hoc erro, quod animos hominum immortales esse credam, lubenter erro, nec mihi hunc errorem quo delector dum vivo extorqueri volo.'"—(*Medical Times and Gazette.*)

"*Origin of Infusoria.*—Prof. Bennett, in a lecture 'On the Atmospheric Germ Theory and Origin of Infusoria,' delivered before the Royal College of Surgeons, Edinburgh, on January 17th, 1868, stated the conclusions to which he had been led by observations conducted by him for a number of years. He considers that the infusoria, 'vegetable and animal, which we find in organic fluids during fermentation and

putrefaction, originate in oleo-albuminous molecules, which are formed in the fluids, and which, floating to the surface, constitute the primordial mucous layer of Burdach, the proligerous pellicle of Pouchet. There, under the influence of certain conditions, such as temperature, light, chemical exchanges, density, and composition of the atmospheric air, and of the fluid, etc., the molecules by their coalescence produce the lower forms of vegetable and animal life.' He carefully describes the movements of bacteria and vibriones; and the disputed question as to how these grow in length he has settled by actual observation. On two occasions he saw two isolated bacteria unite together lengthways, so as to form a single moving filament. He points out that the so-called germs, collected by Pasteur from the air by means of gun-cotton, are wholly unlike the great majority of the particles we see in the proligerous pellicle. Moreover, these so-called germs, when they can be detected, are exceedingly few in number, whereas any fragment of the proligerous pellicle is crowded with incalculable numbers of molecules, for which, he contends, Pasteur's germs are wholly inadequate to account. The notion that the molecules of the pellicle multiply by division he considers opposed to the fact that they always appear before the vibriones, and evidently unite to produce these: further, he says, 'if the primary molecules on the surface of an infusion possess the property of dividing, they cannot at the same moment possess the property of elongating and forming filaments. The one function is subversive of the other. While, then, a cell or vibrio may possess the property of growth and division, these two functions must be exercised at different periods of time, so that, in reference to the early stage of formation, if the molecules divide, bacteria and vibrios could not be formed. A mass of vibrionic molecules is not a compound organism; it is a mere aggregation of similar simple elements. Each of these in passing through certain phases of development may be arrested, or reach maturity at various periods, so that we frequently see different forms present at one time; but that the same forms and the same stages of growth should exhibit directly opposite functions, is surely not in accordance with physiological knowledge.' Therefore his conclusion is that the vibriones and other filaments are evidently formed from the molecules, and not the molecules from the filaments. He has also performed numerous experiments, with a view to determine whether or not it be possible to prevent the development of infusoria in a fluid by means calculated to destroy germs. These experiments were similar to those performed by Schutze, Schrœder, and Dusch, and others, with this difference, that he in every case used nearly all the agents which have been proposed to destroy germs. These experiments have convinced him, that although means be used sufficient to destroy germs in an infusion and in the air in contact with it, infusoria are developed notwithstanding. In conclusion, he points out that these facts and arguments are hostile to the doctrines 'omne vivum ex ovo,' 'omne cellula e cellula,' and lastly directs attention to many circumstances which show that organic forms are first produced, and vital properties are afterward added to them."—(*Edinb. Med. Journ.* and *Amer. Journ. Med. Sci.*)

Neurasthenia and Phosphorus.—"Is neurasthenia due to a want of phosphorus in the central nervous system?

"According to the analyses of L'Heritier (quoted by Prof. Draper), the amount of phosphorus in the brain of infants is $\frac{8}{1000}$, of adults $\frac{18}{1000}$,

of the aged $\frac{10}{1000}$, of idiots $\frac{8.5}{1000}$. From the same authority we learn that the quantity of phosphorus in the spinal cord of the adult is $\frac{10}{1000}$. From this it would appear that the amount of phosphorus in the brain bears a relation to the intelligence of the individual. The Germans have gone so far in their estimate of this ingredient of the brain as to say 'ohne phosphor kein gedanke'—'without phosphorus no thought.'

"Is it due to excess or deficiency of the other normal constituents of the brain and spinal cord? L'Heritier and Lassaigne show that the brains of the aged contain more water than those of adults; while the brains in youth contain more than those of the aged, and those of infants still more. Of fat, the spinal cord and brain of adults contain from six to eight per cent., and those of infants, idiots, the aged, and the adolescent from three to five per cent. Osmazome and salts are most abundant in the aged, and in idiots. These observations seem to show clearly that the activity and vigor of the central nervous system must depend very materially upon its chemical structure.

"Does neurasthenia depend on deficiency of nervous force? Modern science has given us clearer ideas of this *vis nervosa*. Prof. Helmholtz has shown its velocity to be at the rate of about 97 feet in a second. In the active and sprightly its transmission is more rapid than in the cold and phlegmatic. These experiments, taken in connection with the researches of Count Rumford, Jonle, Meyer, Gron, Liebig, Faraday, and Carpenter, seem to render it probable that the nervous force is only another manifestation of the other great natural forces—light, heat, magnetism, and electricity—correlated with them and therefore dependent on them. That it is not identical with electricity is proved by the comparative slowness of its transmission. If this nervous force be another manifestation of the other great forces of nature, it must be largely influenced by them and must rise and fall with them. Therefore it logically follows that the nervous force of any individual may be diminished by insufficiency of light, heat, and electricity, by abstinence from exercise, deprivation of rest, want of nutriment, or sudden mental and moral excitement.

"It is probable that the brain and spinal cord of neurasthenic patients are more or less deficient in phosphorus or in fat, or may contain an excess of water, or may be lacking in nervous force. It is, however, only by accurate microscopic examinations of the nervous centres of patients who have died in a neurasthenic condition that we can arrive at the facts of the case.

"Neurasthenia may be caused by excessive or disproportionate labor of the brain, by submitting to undue responsibility, by anxiety, and by over-indulgence of the passions."—(*Medical Gazette.*)

Paralysis.—In one of his instructive lectures on the Diseases of the Nervous System (*Medical Times and Gazette*), Dr. Saml. Wilks offers the following general observations on this subject: "Although it may appear difficult to understand the condition of the spinal cord in temporary or curable paralysis, it is less easy to comprehend a functional affection of a nerve. Yet we find a particular nerve, or the parts which it supplies, variously affected, and we meet in one case with a neuralgia, in another anæsthesia, in a third a spasm, and in a fourth actual paralysis of some special muscles. One of the simplest theories which we have to explain the phenomena is that of reflex action; as, for instance, if pain exist in a particular spot, and we

discover some source of irritation elsewhere, and we know that a nervous communication exists between the two localities, we at once have our explanation. It is one which can be proved to be true in many instances. Cases of paralysis of a nerve of motion, shown by loss of power in a certain part of a limb, I have already alluded to; but after endeavoring to discover every possible local cause for the paralysis, we are often left without an explanation. Alteration in sensation is very common; it implies either a most important or deep-seated disease of the spinal cord, or is a mere temporary trouble of little importance. For example, in the very worst forms of paraplegia, anæsthesia is one of the symptoms, while, on the other hand, we have patients who are able to walk about and present no appearance of disease, and yet declare that they have lost all feeling in some particular part of the body. These persons are mostly hysterical women, so that we may generally diagnose from this symptom the nature of the complaint. In these persons you will often find what I have before mentioned, the remarkable difference which exists between anæsthesia and analgesia, or between the insensibility to touch and the insensibility to pain. Of course, where the first abnormity exists, the second must also; but it is remarkable that the ordinary sensation of touch may be perfect, and yet the patient be insensible to pain. Thus, it is not at all uncommon to see an hysterical woman who can feel well, as in using a needle for the purpose of stitching, and yet could bear that same needle to be thrust through her skin without flinching. With this cutaneous analgesia there is often also a muscular anæsthesia, proved by the action of the galvanic battery, which, although producing the ordinary contraction of the muscles, will cause no painful sensation.

"Then we meet also with strange and perverted feelings in some part of the body, as 'pins and needles,' or tinglings in the tips of the fingers. These may denote a central disease, or be altogether local. They may be premonitory to apoplexy or ramollissement in patients where the vessels are diseased. An old gentleman whom I know has suffered for three years without any relief. Also in Bright's disease such symptoms are not at all uncommon. They are often experienced by gouty persons, especially when rising from bed in the morning. When every explanation has been sought in vain to account for this affection, we must regard it as purely functional. I have quite lately seen a young man who, on several occasions during the last two years, had paroxysms of tingling in his left hand. He is highly nervous, and almost hysterical at times. It probably is due in some cases to cardiac disturbance, seeing that the sensations are described exactly in the same parts as felt in angina pectoris.

"Then not only may the motor function of a nerve suffer, and all its sensory functions, but also that portion of the nerve which rules over the blood-vessels and nutrition. This is seen in the case of young people whose fingers become dead. I have observed the phenomenon mostly in those persons who have weak digestion, and whose circulation flags after a meal; instead of feeling refreshed after eating, they become chilly or cold, and then perhaps one particular finger will gradually lose its color until it becomes dead. It is quite white; no blood can be seen in it, and sensation is lost, just as if it had been subjected to a freezing process. This only endures for a short time, and the circulation returns."

Treatment of Neuralgia. By Julius Althaus, M.D.—"In an interesting paper on 'Epileptiform' Neuralgia in your last impression, Dr. Anstie has done good service by repelling the notion, now generally prevailing, that this affection is to be considered incurable. To the remedies which Dr. Anstie has mentioned as chiefly valuable in the treatment of this terrible disease, may be added the operation of neurotomy, which is at present perhaps too little thought of. It is quite true that neurotomy has often failed to afford permanent or even temporary relief in such cases; yet Professor von Bruns, of Tubingen, has proved, by a very able analysis of a large number of such cases, that in many of them the result was unsuccessful merely because errors in diagnosis had been made, while in some of them the operation had not been efficiently performed: and that, after deducting these cases, there remains a number of others in which neurotomy has been followed by really satisfactory results.

"As regards the continuous galvanic current, of which Dr. Anstie speaks in terms of praise, a few more years will no doubt show whether this remedy will not eventually prove more effectual than any other in the treatment of Fotherhill's disease, as there is even now strong reason to believe. In one of the most interesting cases of this kind which is on record, the continuous current proved successful, after not only the most appropriate drugs, but also a variety of surgical operations had failed to afford relief. In this case, which has recently been published by Dr Wiemer, Professor Bilroth, of Vienna, performed successively the following operations within three years: Extraction of several teeth; neurotomy of part of the infraorbital nerve; removal of the painful portions of the alveolar process by means of raspatories; osteo-plastic resection of the upper jaw, and division of the second branch of the fifth nerve close to the foramen rotundum; excision of the buccinatorius nerve; resection of the posterior dental nerves and of the mental nerve; and finally, ligature of the left common carotid artery. Most of these operations relieved the patient for a time, after which the pain returned, with its usual severity, in different branches of the fifth. The patient then consulted Professor Niemeyer, of Tubingen. An idea of the severity of the pain at that time may be formed from the circumstance that the patient was then obliged to use daily eight grains of morphia, injected subcutaneously, for mitigating the violence of the paroxysms. Professor Niemeyer used the continuous galvanic current; the patient soon became able to dispense with the morphia, and within three months from the commencement of the treatment he was to all appearance perfectly well. Of course a relapse may occur after the galvanism, as it did after neurotomy; yet, as the remedy proved rapidly successful, it is to be presumed that if there should be a relapse, it would again produce the same effect. A case of a similar kind, where the continuous galvanic current proved successful after everything else had failed, occurred in my practice two years ago."—(*Lancet.*)

Nitrous Oxide as an Anæsthetic.—"The Dental Hospital and the Odontological Society of London have recently been conducting an extended series of experiments on the value of protoxide of nitrogen, or laughing gas, as an anæsthetic agent. The final conclusions drawn were that protoxide of nitrogen is not useful as an anæsthetic in severe and prolonged surgical operations, but acts well in minor cases. Children, it is stated, are most readily affected by the gas, remain the shortest

time anæsthetized, and recover more rapidly than others. The reverse is the case with women."—(*Med. and Surg. Reporter.*)

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"*Differences between Rickets and Mollities Ossium.* By Joseph Jones, M.D., Professor of Chemistry in the Medical Department of the University of Louisiana, New Orleans, La.—Upon a superficial view, rickets and mollities ossium appear to be closely connected, on account of the flexibility of the bones and the fractures upon slight causes which characterize both diseases. Some authorities, led by their general resemblances, have regarded the latter disease as rickets attacking the adult. A careful analysis and comparison of the phenomena of the two diseases, however, will show that the resemblances of the two affections are far exceeded by their differences.

"A deficiency, actual and relative, of phosphate of lime in the osseous system characterizes both mollities ossium and rickets; in the former, however, the skeleton, originally normal in structure, loses its earthy matter, becoming fragile, soft and pliable; in the latter the osseous structure is abnormal from the first, or from an early age. Guerin found that, of three hundred and forty-six cases of rickets, two hundred and nine were affected between the first and third year, three were congenital, thirty-four occurred between the ages of four and twelve; one hundred and forty-eight were males and one hundred and ninety-eight females. Cases of congenital rachitis have been mentioned by Hippocrates and other writers. Mr. Jamblin has described a skeleton affected with rickets in a seven months' fœtus. Rickets have been observed in the young of wild animals (lions and tigers) born during the captivity of their parents. The disease appears to be intimately connected with a marked cachexy of the system, which seems to be identical with the scrofulous, and to be induced by insufficient nourishment, combined with bad hygiene, damp, foul air. The process of dentition, also, by the disturbances which it causes in the alimentary canal, and by the drain which it establishes upon the mineral constituents of the blood, tend to develop and aggravate the disease.

"On the other hand, mollities ossium attacks adults, especially women, after they have commenced child-bearing.

"In the sixteen cases collected by Mr. Curling, thirteen occurred in females, and only three in males; eleven were fatal between thirty and forty; in none did the disease show itself before puberty; but two patients were above fifty years of age, and several of them were delivered of children during the progress of the complaint.

"The softening of the bones is slow and gradual in rickets, and unaccompanied by pain; while in mollities ossium it is accompanied with great pain. Sir Charles Bell quotes a remarkable case of mollites ossium, where a man, going up-stairs, struck his toes against a step and broke his thigh bone. The surgeon attended with all the proper appliances to the thigh bone, but the usual period expired without union being discovered at the fractured part. A consultation being called, on raising the leg the thigh bone broke again in the hands of the surgeons.

"The disease proceeded to such an extent that the flexor muscles twisted the bones, so that the heels were drawn back of the head, and the trunk itself, before death, became greatly flexed.

"Mollities ossium progresses in almost all cases to a fatal issue. In rickets, after a time, the abnormal condition is cured by treatment, or by the progress of age. Earthy matter is deposited in even more than

its due proportion, the skeleton becomes solid and strong, and the general health may be entirely restored.

"If the patient outlive rickets and die afterward, it will be found upon dissection that the bones have assumed great weight and density, and, in some instances, the cavities of the cylindrical bones are said to have been filled up with earthy matter. And it has been noticed, in some instances, that such persons, on recovery from the disease, acquire a surprising degree of strength.

"Sir Charles Bell mentions an individual by the name of Fanal, known on the streets of London as 'Leather Coat Jack,' who would throw himself under a hackney coach and allow the wheel to go over him for a pot of porter. This short, deformed man, who had been afflicted with rickets in his youth, exhibited great feats of strength—bearing an anvil on his breast, and carrying the tallest men by placing his arms under their thighs. Sir Charles Bell also cites the extraordinary manifestations of strength by another dwarf and rickety subject, called the 'Little Hercules.'

"The general health in mollities ossium is hopelessly impaired, the flesh and strength diminish daily, and, in some cases, the muscles undergo fatty degeneration. The observations thus far recorded have not been sufficiently numerous or sufficiently accurate to decide the question, whether the degeneration of the muscles is always present in this disease. The fatty degeneration of the muscles in those cases in which it has been observed can, with great reason, be referred to the action of the same causes which evidenced the softening and degeneration of the bones.

"The pale color of the muscles in some cases of rickets appears to be due to the anæmic condition of the system rather than to fatty degeneration of the muscles; and we have just seen that after recovery from this disease the muscular strength, so far from being impaired, is often wonderfully increased.

"In mollities ossium the loss of earthy matters in the osseous system is rapid, and is frequently attended with a copious phosphatic deposit in the urine; and the bones do not simply lose their earthy constituents, and become reduced to their cartilaginous flexible tissue, but there is an actual change in the living cellular elements of the bones, and a progressive degeneration, so that in many cases the bones consist finally of an external shell, filled with oily or lardaceous matter, held in membranous tissue. Though pathologists are still in doubt as to the exact nature of the change of the osseous system in this disease, the observations of Mr. Solly and of Mr. Dalrymple have shown the existence of a process of active change, as manifested in the afflux of blood to the parts affected, and the abundant cell growth. Mr. Dalrymple has found by microscopical observation that the bone corpuscles are considerably enlarged. Enlargement of the Haversian canals and of the lacunæ is observed. The cancelli are loaded with large oil drops, often tinted red, and combined with these numerous cells, varying in size from the $\frac{1}{1200}$ to $\frac{1}{500}$ of an inch in diameter, containing a rounded nucleus, also varying much in size, and occasionally showing various stages of division and of endogenous development. And while there is a diminution of the earthy constituent, there is, at the same time, some important change in the animal basis of the bone; it no longer yields healthy gelatin, and is saturated with oil, which, to a great extent, is not contained in cells, but lies as a free fluid in the cancelli and medullary canal, and readily drains out when the bone is placed in an inclined position. The

color of the oil is also peculiar, presenting bright yellow, pink, and deep crimson hues. These changes are probably owing, as Bennett has said, to an exudation from the blood-vessels, mingled with more or less extravasation of the colored corpuscles, in which new cells are developed, combined with fatty transformation of the albuminous and fibrinous materials. Virchow has traced fatty degeneration in inflamed bone as a part of the process of softening which precedes its expansion or absorption. Very often small fatty molecules appear in the bone corpuscles, and Virchow has traced their enlargement to the gradual softening, disintegration and final liquefaction and separation of the proper bone substance immediately surrounding and including each corpuscle. Analogous changes have been traced by Goodsir and Redfin in cartilage, and Virchow has pointed out their relation to fatty degeneration as a part of the inflammatory process. And these changes in inflamed bone are of special interest, inasmuch as they are the results of the same process as that by which, nominally, the medullary spaces and areolæ of growing bone are formed, and by which mollities ossium is supposed to be produced.

"On the other hand, the softening of the bone in rachitis should be regarded as arrested development of bone, with an increased growth of cartilage cells. In this disease the whole bone is soft, easily cut with a knife, and preternaturally flexible; cancellous texture of a brown or reddish hue predominates, and is at first filled with a serous liquid, which may be squeezed out, as if from wet leather; after some time the serous or albuminous liquid occupying the tubes and cancelli is transformed into a gelatinous substance, which is gradually organized into a cartilaginous state. The power to separate and deposit bony or earthy matter appears to be entirely wanting in the original cells of the osseous system in mollities ossium, while in rachitis this power is only temporarily suspended or arrested, and is resumed with increased energy after the removal of the diseased state."—(*St. Louis Med. Reporter.*)

"*Permanent Union of the Maxillary Bones.* Reported by W. B. Conway, Student of Medicine.—Professor Warren related the following case, which had recently occurred in his practice: Miss D., aged eighteen, a native of Virginia, recently visited Baltimore to secure the professional services of the professor.

"A very singular condition of things presented itself, from which much deformity and great inconvenience resulted. As the effect of ptyalism, which occurred at the age of *four* years, the alveolar process of the superior maxillary had been destroyed, and an osseous band developed, which incased the lower teeth, and attached itself to the alveolar process of the inferior maxillary, binding the two bones firmly and permanently together.

"The tissues of the cheek were greatly atrophied, while the integument was adherent to the bony structures beneath it, being held down by bands of organized lymph in this position.

"The *inferior* maxillary could not be separated from the *superior* to the smallest extent; and for thirteen years the patient had been nourished only by liquids and such articles of a semi-solid consistence as could be sucked or pushed into the cavity of the mouth through openings between the teeth on the opposite side.

"As a natural effect of this mode of feeding, she was delicate and anæmic, though no disease of any important organ existed. Upon ex-

amination, Professor Warren ascertained that there was no anchylosis of the tempero-maxillary joint, and that the pterygoid muscles were neither paralyzed nor degenerated. Relying upon these facts, together with the integrity of the masseter and temporal muscles of the healthy side, he concluded that it was possible to restore the movements of the inferior maxillary and to relieve the patient from her condition of embarrassment, by an operation, which was performed in the following manner: seating the patient in a dentist's chair, and placing her in a semi-recumbent posture, chloroform was administered. A probe-pointed bistoury was then introduced through the mouth, between the cheek and the bony structures, and the adhering tissues carefully separated from their attachments, taking special care not to divide the facial artery which was much exposed. The upper bicuspid tooth on the affected side was then extracted, and an attack made upon the bony deposit by which the maxillary bones were bound together. This osseous band was found to be excessively hard, but by employing first a saw and then a strong pair of forceps, the first of the lower teeth imbedded in it was reached, and the tooth extracted. This gave still more space to work in, and enabled the professor, after much labor, to reach the second one of the incased teeth and to remove it. These different steps were repeated until there was room enough for the introduction of Liston's bone forceps, when the whole of the intervening mass was cut through, and the inferior maxillary entirely released. A spatula was then passed into the mouth, and the jaws separated widely by the employment of considerable force. The chloroform was then discontinued, and, so soon as the anæsthetic condition had passed off, it was ascertained that the patient could open and close her jaws at will. Lint was then introduced between the divided bony surfaces, and also in the cavity of the jaw, between the tissues and the osseous structures from which they had been detached, and the patient removed to her bed. Upon examination, it was ascertained that she had been kept under the influence of chloroform for two hours and twenty-five minutes, so tardily was the osseous band divided, in consequence of its extreme density, and of the disadvantage under which the operator labored in assailing it. Not an unfavorable symptom presented itself from this time forward. By the frequent introduction of lint in the manner stated above, the divided surfaces were kept from uniting again; and in a short time the patient returned to her home, being able to open her mouth and to masticate food without difficulty. The improvement in her power of articulating words, as well as in general health, was most marked and decided, while the deformity was almost entirely removed. The professor stated that he was under obligations to Prof. C. W. Chancellor, Dr. A. H. Powell, and Dr. H. M. Grant for the faithful and intelligent assistance given by them in the performance of the operation. The latter, Dr. Grant, being not only a physician, but a skillful dentist, rendered invaluable service."—(*Medical Bulletin.*)

Removal of Superior Maxillary.—"Professor Warren recently removed the superior maxillary of a boy, aged fifteen, in the presence of his class, for what appeared to be simply a disease of the antrum. The bone was readily excised, without serious detriment to the patient, or the loss of much blood, when a large, fibrous polypus was discovered, attached to the basilar process of the occipital bone, filling up the posterior nares, pushing up the floor of the orbit, occupying and distending

the antrum, presenting itself in a large vascular mass on the outer aspect of the alveolar process of the superior maxillary. This tumor was removed with great difficulty, and *shock* followed, from which the patient could not be rallied."—(*Ibid.*)

Luxation of Lower Jaw.—"Dislocations are of all accidents the most rare; I fancy because the natives of the lower classes do not wear shoes, and seldom fall. In fact, last year I had only one case of dislocation; it was of the lower jaw, in a funny old lady, who laughed it out of joint. We succeeded in reducing it, however, three weeks after the accident happened."—(*Dr. Davidson's Report of the Antananarivo Dispensary for* 1865–6 and *Med. Times and Gaz.*)

"*Third Dentition.*—Dr. H. H. Nelles, dentist, reports in the *Canada Journal of Dental Science*, the case of a lady forty-five years of age, from whom he extracted a number of roots preparatory to the insertion of a full set of artificial dentures. Upon a second visit, to his surprise, he found that nature had sent forth a well developed superior *cuspidatus.* In anticipation that nature would complete the work thus auspiciously begun, Dr. Nelles deferred inserting an artificial set of teeth. This case brings to mind a fact related of himself, by a gentleman of our acquaintance. When he was nineteen years of age, his four upper incisors were broken off by a blow with an iron bar. The roots were extracted but no artificial teeth inserted. Some months after, while at the table eating, he was greatly startled to discover the points of teeth projecting through the gum. The incisors soon fully supplied the place of the lost second teeth, and are as perfect in every particular as one could wish."—(*Henry Gibbons, Jr., M.D. Pacific Med. and Surg. Jour.*)

Death from Swallowing Artificial Teeth.—"On January 17th, Mr. Harrison Treibley, residing in Pottsville, Pennsylvania, awoke about one o'clock with a choking sensation, and it was discovered that a silver dental plate, about two inches in diameter, with two teeth attached, had passed into his throat. He was unable to speak, and every effort caused the plate to descend still further. During the day and night his sufferings were intense, but the next day it had passed into his stomach. His sufferings were thereby much lessened, although still severe. Toward the latter part of the week his sufferings increased, with spitting and vomiting of blood. This continued until Sunday morning, January 24th, when death ensued.

"A *post-mortem* examination was made on Monday by Dr. John T. Carpenter, assisted by Drs. James S. Carpenter and Charles T. Palmer. Considerable quantities of suffused blood were found in the stomach, but, singular as it may seem, no trace of the plate or teeth could be found, either in the stomach or intestines. The only conclusion which could be drawn from this was, that it must have passed through and been voided with the excrements from his body; yet the statements of the family are that these were carefully examined, without finding any parts of the same."*—(*Med. and Surg. Reporter.*)

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* It is most probable that it passed into the trachea, and would have been found therein.—Z.

Emphysema from Gangrenous Sores at Angle of Mouth.—"Dr. T. P. Heslop, physician to the Children's Hospital, Birmingham, reports a very remarkable case of general emphysema in a boy, aged four years, from gangrenous sores at the angles of the mouth, after measles. Autopsy showed the absence of ulceration in the air-passages, and proved conclusively that the emphysema resulted from the entrance of air, during *expiration*, between the integument and mucous membrane of the angles of the mouth, which were cleanly separated, so that the handle of a scalpel could be inserted between them, for nearly an inch, into the cheek."—(*Richmond and Louisville Med. Jour.*)

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"*Transfusion.*—Prof. Landois, of the University of Greifswald, who has interested himself much in the subject of transfusion, after giving a critical account of the most recent publications on the subject, thus sums up, in a recent number of the *Wien. Med. Woch.*, the results that have hitherto been obtained: 1. Transfusion has been performed 99 times in cases of hemorrhage, in 11 of which cases no successful result was even possible. Of the remaining 88 cases, 65 were attended with success, 20 were unsuccessful, and in 3 the result was doubtful. 2. It has been performed 12 times in cases of acute poisoning, one of these being hopeless. In 3 the results were favorable, and in 8 unfavorable. 3. For various forms of disease attended with exhaustion, it has been resorted to 43 times, the most unfavorable prognosis having been frequently delivered. In these the results were favorable in 12, unfavorable in 21, and doubtful in 9, while in one case it was a mere desperate experiment. Prof. Landois observes that these statistics speak very satisfactorily for transfusion, and that the results would be far more favorable if this almost harmless operation were not usually driven off to the last minute."—(*Med. Times and Gaz.*)

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Blue Line on the Gums from the Internal Use of Nitrate of Silver.—"According to MM. Charcot and Vulpian's observations on man, the effects of the nitrate are divisible into four periods. During the first there is no irritation of the intestinal canal produced, unless gastralgia arise from too large a dose, itching of the skin, or sometimes a little papular erythema, being all that is observed. When a more or less quantity has been absorbed (the minimum being a total of thirty grains), a deep blue line is observed at the necks of the teeth, the buccal membrane also exhibiting black patches. This is generally after three months' administration; and when the nitrate is still no longer continued, the blackened skin may be produced. To these three periods a fourth may be added, which is characterized by a general impregnation of the economy, producing black granulations in most of the tissues and viscera."—(*Med. Times and Gaz.* and *Med. News.*)

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Iodine and Carbolic Acid for Local Application.—As a substitute for this, Dr. Alex. Boggs recommends in the *Lancet* the following: "Tincture of iodine, one drachm and a half; glycerin, two ounces; solution of chlorinated lime, six ounces. Half an ounce of this solution to six or eight ounces of water is used in all cases to which the tincture of iodine or chlorinated lime is applicable. The solution is perfectly colorless, and may be used with advantage as an injection in diseases with fetid discharges."

Sulpho-Carbolate of Zinc.—The *Lancet* states that "since the beginning of the year, Mr. Wood has used extensively a double carbolate salt, which was first, he says, manufactured at his suggestion. This salt is the sulpho-carbolate of zinc. It is a definite crystallizable compound, composed of the sulphate of zinc and the carbolate of zinc. Its formula is, according to an analysis made by Professor Bloxam, of King's College: $C^{12}H^5ZnO^2,2SO^3+Aq$. Its most perfect crystalline form is right rhombic plates, of a flesh color; and its more common form, as supplied by the maker, is in agglomerated amorphous masses of a pinkish-white color. It is very soluble in water, and gives off no smell of carbolic acid whatever, either in the solid form or in solution. This salt, in aqueous solution of from three to six grains to the ounce, Mr. Wood has found of great service in all cases to which the use of carbolic acid is applicable as a dressing for wounds. It appears to combine all the astringent and detergent properties of the sulphate of zinc with the peculiar antiseptic and antipurulent properties of carbolic acid, and possesses the additional advantages of giving off the carbolic acid, in measure and gradually, by a slow decomposition of the salt, under the chemical influence of the discharges. The solution of the sulpho-carbolate of zinc has been extensively used as a dressing to wounds and sores in the practice of Mr. Wood. It removes all odor as promptly as the carbolic lotion, while it is less irritating, more detergent, has no smell, and as effectively prevents all fungoid or sporular formations in moist dressings during hot weather as the carbolic acid itself."

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"*A New Styptic Collodion.*—Efforts have been made to perfect collodion as a hæmostatic by the addition of substances which cause an instant coagulation of the blood, such as the perchloride of iron, but such mixtures have not been easy to make, and hence have not proved satisfactory. Carlo Parvesi communicates the following formula for a new collodion, to the *Giornale di Farmacia di Torino:*

Collodion	100 parts.
Carbolic acid	10 "
Pure tannin	5 "
Benzoic acid	5 "

Agitate until the mixture is complete.

This preparation, which has a brown color, leaves, on evaporation, a pellicle exactly similar to that of ordinary collodion. It adheres strongly to the tissues, and effects the instantaneous coagulation of blood and albumen. Tannin effects a consistent coagulation of the blood, while benzoic acid has a cicatrizing action on the tissues."—(*Chemist and Druggist.*)

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"*Parkesine.*—We have already called the attention of our readers to this newly-invented material, which, in some of its applications, is destined to take the place of caoutchouc and gutta-percha with great advantage. It consists in brief of an intimate mixture of vulcanized oil and collodion. We now present some newer details, lately published, in regard to its preparation. The oils used may be any of the so-called drying oils, as linseed oil, nut oil, castor oil, etc., and for vulcanizing them chloride of sulphur is used in various proportions, according to the nature of the product desired. For instance, in greater proportion, if the material is to be solid and hard, and in less if it is to be elastic and extensible. The temperature of preparation varies cor-

respondingly with these different objects, between 200 and 300 degrees Fahrenheit. The collodion is prepared by treating cotton in nitro-sulphuric acid, and then washing with water in a centrifugal apparatus, next pressing out the moisture and then dissolving the expressed mass in nitro-benzole. The collodion is separated in the form of a pellicle by pouring the solution into water. The two constituents are worked up together, and the mass is then pressed into the desired form and vulcanized. The applications of this material are as varied as those of caoutchouc and gutta-percha, and are adapted even to cases where these substances cannot be well employed. For the imitation of marble, in all shades, as well as of mother of pearl, tortoise shell and ivory, there is nothing to compare with it. The price of the article has now become very reasonable. For ordinary colors—as white, yellow, green, brown, chestnut, etc.—the cost is about a dollar per pound; for the rarer colors—as blue, scarlet, imitation of marble, etc.—it is about a dollar and a quarter. Knife-handles, of great beauty, made of this material, cost in England from four to fifteen dollars per gross."—(*Phila. Ledger.*)

"*Artificial Ebony.*—This substance, now used to a considerable extent in Europe, is said to be prepared by taking sixty parts of seaweed charcoal, obtained by treating the seaweed for two hours in dilute sulphuric acid, then drying and grinding it, and adding to it ten parts of liquid glue, five parts gutta-percha, and two and a half parts of india-rubber, the last two dissolved in naphtha; then adding ten parts of coal tar, five parts pulverized sulphur, two parts pulverized alum, and five parts of powdered rosin, and heating the mixture to about 300 degrees Fahrenheit. We thus obtain, after the mass has become cold, a material which, in color, hardness and capability of taking a polish, is equal in every respect to ebony, and much cheaper."—(*Sci. Amer.*)

Artificial Ivory.—It is stated (*Ibid.*) that "mock ivory may be made by mixing isinglass and strong brandy into a paste with finely powdered egg-shells. It should be cast in moulds, previously well oiled, and be left to dry. It is said to resemble real ivory when hard."

Ivory made Soft and Ductile.—"According to the process of Geisler, in Switzerland, articles of ivory are placed in a solution of phosphoric acid of 1·13 specific gravity, and left there until they assume a transparent aspect. After this, they are taken from the acid, washed off in water, and dried with soft linen cloth. The articles are now as soft as thick leather; they become hard in the open air, and when placed in warm water they assume their former softness. The change evidently consists in a solution of a portion of the lime producing a composition containing a smaller percentage of lime than ivory."—(*Dingler's Polyglot Journal* and *Boston Jour. of Chemistry.*)

"*New Cement for Teeth.*—Freshly-calcined oxide of zinc, 9 parts; finely-powdered borax, 1 part; finely-powdered silex, 2 parts; all mixed well together. A correspondent of the *Druggist* states that this makes a firm, plastic mass, and that it is used by French and German dentists."—(*Ibid.*)

"*Cement for Stone.*—Böttger informs us that a cement of extraordinary binding power is made by using infusorial silica in place of quartz

sand. This infusorial earth is found in Germany only, but it has been imported into this country in considerable quantities. It consists of hydrated silica, which combines with bases much more readily than silica in the anhydrous condition, as in quartz sand. The infusorial silica is mixed in about equal proportions with oxide of lead; about half a part of freshly-slaked lime is then added, and the whole is made into a paste with boiled linseed oil. The cement thus made quickly becomes as hard as sandstone, and will be found extremely useful in such work as fixing iron in stone for balusters and railings. It is not likely, we think, to expand in setting, and thus no risk of splitting the stone will be incurred. In this respect alone it offers a great advantage over Portland cement, sometimes used for the purpose we have mentioned, which, according to some authorities, does expand, and in consequence of which one very serious accident is supposed to have resulted."—(*Am. Artisan.*)

Cement for Iron.—The *Sci. Amer.* says that "the best quick-setting cement we know, for uniting iron, as pipes, etc., may be made by mixing powdered sal ammoniac, 1 part; powdered sulphur, 2 parts; iron filings, 80 parts; all by weight, with sufficient water to make a paste of the required consistency. The red lead cement for face joints is made of white and red lead, equal parts, mixed with raw linseed oil to the proper consistency."

Cement for Iron, etc.—"A useful cement for closing up cracks in stove plates, stove doors, etc., is prepared by mixing finely-pulverized iron, such as can be procured at the druggists, with liquid water glass, to a thick paste, and then coating the cracks with it. The hotter the fire then becomes the more does the cement melt and combine with its metallic ingredients, and the more completely will the crack become closed."—(*Phila. Ledger.*)

Lubricate for Lathe Work.—"The enormous consumption of oil in lubricating articles exposed to the cutting action of a turning lathe may be avoided by the use of a solution of soda soap, without any injurious effect upon the article manufactured, or upon the machinery. The soap water is prepared by beating about forty pints of water in a suitable vessel, adding twenty ounces of soda soap, and after the solution is complete, adding ten or twelve ounces of soda to it. This soap water is placed in a vessel above the level of the cutter, and allowed to run in a fine stream upon the tool. It is then collected in a vessel beneath the bench, and reconveyed to the original reservoir by means of a forcing pump."—(*Ibid.*)

Cleaning Files.—James F. Smith states, in the *Scientific American*, "that he has tried a very effective way of cleaning files filled with work, by simply holding them in a jet of steam under forty pounds pressure. In one minute the files come out 'as good as new.'"

Illuminator.—The *Sci. Amer.* says: "A new illuminating material, recently patented in Germany, consists of a mixture of two parts of the poorest rapeseed oil, and one part of good petroleum. It is burned in a lamp of peculiar construction, but somewhat similar to that of the ordinary moderator lamp, and gives a light not to be surpassed for purity and brilliancy."

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, MAY, 1869. No. 5.

ORIGINAL COMMUNICATIONS.

TEMPERAMENTS.

BY VARNUM D. COLLINS, D.D.S., HONG KONG, CHINA.

(Continued from page 174.)

THE four leading temperaments are the *Bilious*, *Lymphatic*, *Sanguine*, and *Nervous;* though some writers omit the last and substitute the *Encephalic*, for the nervous and melancholic. Let us attempt to group the characteristics of each, in the order stated.

In the *Bilious temperament* there is a predominance of the biliary system not to be mistaken. The pulse is hard and strong; the complexion dark, sallow, or yellowish brown; the hair black and luxuriant; the eyes dark and sparkling; the teeth generally strong and of a yellow, waxy color. In the muscular movements, there is more of firmness or force, of directness, rapidity, restlessness and strength of action, than of grace and ease; and while the body is sometimes fairly developed, there is more of density and angularity than roundness of outline.

In regard to the mental and moral characteristics of this temperament, they may be summed up, in a general way, as follows: a strong susceptibility and constancy of feeling; a quickness of perception, generalization, and decision, proving an elevated healthy cerebral organization; great firmness and inflexibility of purpose; great violence in anger; great stubbornness, impatience, and power of will; great pride, suspicion, dogmatism, and ambition, but often accompanied by forbearance, magnanimity, and generosity. Such characters are admired, hated, courted, feared and applauded by turns. It is claimed that persons of this temperament have earliest developed the moral faculties, and figure most in human history; and that this temperament is characterized by the display of the greatest virtues and the worst crimes.

According to Williams, there is in this temperament probably "de-

fective action in some of the biliary or digestive organs, which are therefore more liable to derangement, than in other temperaments." That there is a *predisposition* in this direction, few persons will deny. The great depurator, of course, in this constitution is the liver; "and so readily does it act, under the stimulus of mercury, that salivation is not easily produced." It bears also very well the action of other powerful medicines, such as morphia and quinine.

In regard to this bilious temperament, there is quite a difference of opinion as to whether xanthous people, those with red or yellow hair, a florid complexion and bluish-gray eyes, are bilious or sanguine. It is a well-known fact that persons of the bilious temperament, having dark hair, eyes, and skin, upon emigrating to higher latitudes, either in simple altitude or greater distance from the equator, have children with light-red hair, bluish-gray eyes and a florid complexion. It is a result which comes about after many generations have experienced the change, and is an effort, on the part of nature, to adapt the offspring of the bilious temperament to a less elevated temperature. The writer has seen, on two different visits to Jerusalem, Israelites (born in Poland, but of Shemitic origin and originally of bilious temperament) who were on a visit to the Holy City, possessing light-red and even flaxen hair, grayish eyes and florid complexions, but still retaining the Jewish physiognomy. In this connection, we desire to mention another very interesting fact which bears on the distribution of races, and on the effect of climate and other causes in obliterating at last all physiological peculiarities. The united evidence of Jewish tradition, numerous Chinese inscriptions, and the observations of early and recent travelers in China (Arabian merchants, Jesuit priests, and Protestant missionaries) goes far to prove that communities of Jews have resided in China for the last 2000 years. Within the last few years Mr. Schereschewsky (of pure Jewish origin) and Dr. Martin, of Pekin, visited at different times a Jewish colony in the Province of Honan. They found these people in possession of the Hebrew Scriptures, but ignorant of its language; the ancient faith nearly if not altogether obliterated, and the physical characteristics of the race entirely gone, though there were evidences in the way of monuments, and traditions in abundance, proving the fact of an ancient Jewish community.

The second leading temperament is the *Lymphatic*, which is the opposite of the bilious. Persons of this temperament are styled cold-blooded and lacking in sensibility. In this temperament, according to Dunglison, "the proportion of the fluids in the body is conceived to be too great for that of the solids;" or in other words, the secretory system (lymphatics and absorbents) does not so thoroughly act as to prevent the cellular tissue from being filled with humors. This cellular repletion, it is generally conceded, depends upon lymph and not fat, which

so predominates as to obscure every other constitutional element, if any exist, whether it be the sanguine or bilious. At any rate, there is no mistaking the strongly-marked lymphatic temperament. There is the heavy, rounded body; the thick lips and cheeks; the short nose, the heavy, half-sleepy expression when in repose; and the comparatively large, rounded head, as contrasted with that of the simply fat man, whose head is small. The hair may be light or dark, but is generally thin, damp, and straight; the eyes are usually blue, but sometimes dark; the teeth good, but not highly organized, and thus but slightly painful under dental manipulation; the extremities are somewhat cold; the skin often pale, flabby, and clammy to the touch; the circulation feeble and the pulse weak; the red corpuscles scarce, and the whole vascular and nervous tone and action of the system seemingly deficient. Persons of this temperament, we can well understand, are predisposed to watery fluxes, to dropsy, and other chronic difficulties; and that the symptoms are latent and obscure.

In regard to the mental and moral characteristics of the lymphatic temperament, there is little passion or vaulting ambition; great self-satisfaction and little envy; the mind is active, the judgment calm and clear, exhibiting more sense than wit, more unruffled good nature than studied attempts at brilliancy of manner or conversation; little given to enthusiasm, but to great perseverance; making, on the whole, safe men to trust, and successful men in business, because they "make haste slowly," and reach fair results by "a masterly inactivity." We must not confound the lymphatic with the simply stupid fat man; for lymph and fat are two distinct things in location, function, and effect. Lymphatic men have often displayed high mental endowments or culture; for, after all, downright perseverance, based on moderate talent, surpasses genius. Some of the most plodding, industrious, and successful races in history have had this temperament predominating, as those of Holland, Germany, and China.

The *Sanguine temperament* is probably the highest manifestation of mere physical life, and the best adjustment and harmony of the organs and tissues for the production of perfect health and happiness. It is characterized by soft light or brown hair; blue or light gray eyes; teeth white, good and strong; an active circulation, and a full supply of the red corpuscles; a rather excitable and irregular pulse; a flushing cheek, red lips, and warm extremities; quickness and ease of movements; often of great physical strength and muscular development; a tendency to voluptuousness in females, who are distinguished for beauty, grace, and vivacity—the whole physical organization being characterized by vigor, force, and life. In this temperament all disorders are apt to assume an acute form, terminating quickly one way or the other. There is a *predisposition* to plethora, to determination, inflammation, and hemor-

rhage, so that, when there is the highest state of health, so to speak, there seems to be the greatest danger of disease. The sanguine are the favorites of health; but, like the favorites of fortune, they move in a circle of danger, so that other temperaments, less favored, enjoy some compensations.

The following are some of the mental and moral characteristics of the sanguine temperament: great hopefulness or elasticity of mind, always looking on the bright side of things, and believing that, somehow or other, everything will come out all right in the end. There is, at the same time, great promptness and enthusiasm, but little determination and perseverance. There is often a lively susceptibility, but no real depth of feeling, earnestness of resolution, or constancy of action. There is great fondness of admiration and display; great liberality of sentiment and bestowment of trivial gifts; a free expenditure on self and superior friends, to win good will, but little self-denial, active benevolence, or moral force of character. Persons of this temperament never suffer much mentally, because they are too fickle, too volatile, too vivacious or too hopeful to brood over the past.

The *Nervous temperament* is hard to define, but not difficult to detect. Many, however, dispute its existence, as such, claiming that many of its characteristics are founded by improper habits upon the bilious and sanguine. No doubt certain habits of parents, and the begetting of offspring under unfavorable and unhealthy conditions of body and mind, "entail upon their children an abnormal organization of the nervous system, which, after a time, becomes observable through such pathological manifestations as have been regarded as the characteristics of the so-called nervous temperament." No doubt this statement embodies a vast amount of physiological truth, which Americans would do well to heed. Our neglect of physical education; our excessive mental stimulants in childhood, youth, and maturity—of the school, of trade, of professional and public life; our vicious and sensational literature; our encouragement of youthful precocity and willfulness; our diet, dress, houses, climate, and intemperate and other habits, are breeding a vast number of unhealthy nervous people in this country.

This nervous temperament, healthy or diseased (whatever may have been its causes), is characterized by a peculiar action of manner which we soon learn to recognize. There are agitation, trepidation, irritability, sensitiveness, sympathy, anxiety, and fear. It is a peculiar temperament, with external appearances somewhat like the other temperaments, and admits of very many modifications. The muscles are generally yielding and small; the body refined and slender; the complexion soft, pale, and transparent; and the reason and will too often subject to the emotions, the impulses, and the passions. There is no question but that this temperament is nearer a *morbid* condition than any other; and is

caused or increased by many improper influences and habits, which, when known, should be at once avoided. We can easily distinguish the nervous temperament, more by the manner of acting and speaking than by the physique; and we know that with this temperament are found many very highly organized beings, men and women of genius, as well as multitudes of poor suffering mortals. Williams states that "the predominance of sensibility and excitability of the excito-motory nerves over other vital functions" constitutes the nervous temperament, which he claims is compatible with health. It often occurs, he adds, that "the symptoms of disease become very prominent, and often cause much suffering and alarm, when little or no real danger exists;" and that these symptoms are very changeable. This temperament, while often healthy, predisposes to all nervous disorders which make life so wretched, when sympathy and patience and gentleness are so proper, acceptable, and soothing.

There is one other temperament which we desire to notice, called the *Encephalic*, which is the best application of phrenology we have yet seen. Among the ancients there was a temperament styled the *Melancholic*, which has been described, generally, under the bilious, though belonging elsewhere. According to Dr. Powell, who has written on this subject, and who claims to have discovered, or rather defined the physical characteristics of the encephalic temperament, the cerebrum is relatively large and the cerebellum small. The other characteristics are: "The person is contracted, the limbs slender, the neck long, the chest narrow, and the abdomen flat. The face is thin and forehead massive, and especially expanded in the upper third. The expression is severe, thoughtful, and often gloomy. The vital powers are slowly developed, and yet compatible with health and long life. Persons of this class are capable of profound investigation, but are subject to monomania."

This encephalic, like the nervous and lymphatic temperaments, is founded upon one of a more vital character. At the present day, and especially in America, the temperaments are not found singly, in one individual, but in combination, the sanguine and the bilious being the two basal temperaments.

With the study of the temperaments and their combinations and indications, the writer already quoted connects the important subject of incompatible, or unphysiological marriages; claiming that physical and mental degeneracy, physical deformity, scrofula, and all cerebral diseases, have their origin, or are increased, by violating the laws, not only of consanguinity, but those connected with the combination of temperaments. Without attempting to press these laws too far, no doubt a proper observance of them would increase the health and happiness of our people.

Having discussed the *causes* and *characteristics* of human temperaments, let us speak of the *relation* and *value* of such knowledge to the

dental surgeon. In the practice of his profession, he comes much in contact with patients of every shade of physical organization and development; and while he seeks to have a large paying practice, he desires at the same time to treat their troubles from the best stand-point, as regards *skill*, *rapidity*, *painlessness*, and *impressions*. Undoubtedly a dentist who understands the whole human organism with its temperaments, and their predispositions and tendencies to disease; their susceptibilities to pain, to chronic troubles, or to rapid resolution, can practice more skillfully, rapidly, and painlessly, and make a deeper and better impression on a patient, than one who follows the mere routine of practice. The great reason why so many allow their teeth to decay, is more the dread of dental manipulation than ignorance of the mischief, or unwillingness to pay a fee; and just in proportion as the dentist is enabled to operate without pain (other things being equal), will his engagement book be filled with names. A thorough knowledge of the temperaments, in connection with treatment and medication, will enable him to properly receive and reassure his patients, and to practice a nearly painless dentistry. He will not treat all constitutions alike in degree, or direction of manipulation, or medication; the lymphatic like the sanguine or bilious; or the nervous like the other three; but so proceed as to use the temperaments as guides and helps in treatment.

Insensibility to pain, or rather the power of endurance, is best exemplified in the lymphatic patient. This power of endurance is owing, probably, to a coarser texture or organization of the nerves, in respect to their ultimate molecules, whereby they do not so quickly or so powerfully respond, as in the other temperaments. Next to the lymphatic comes the bilious, the bilio-sanguine, the sanguine, the nervo-sanguine, the nervo-lymphatic, and the nervo-bilious The true nervous temperament has no power of endurance; while the unhealthy nervous cannot so much as look upon an instrument, or be looked at, much less be persuaded to occupy the operating chair. The latter class of patients will severely try the dentist; but if he will exercise judgment, patience, forbearance, kindness, sympathy, encouragement, and gentleness, he may accomplish wonders and receive the gratitude of his patient.

The dentist should know, also, that his range of practice, of friends, and of usefulness will depend not alone on his skill as an operator, but on his knowledge of men—their idiosyncrasies, their approachable sides, their tastes, constitutions, and weaknesses. Some he would receive with great frankness, in the off-hand manner so acceptable to the sanguine temperament; others, with studied politeness or reserve; and some in a manner which will disarm the patient of fear and trembling, and make them forget, or at least not mind the anticipated operation. He will so manipulate as to place the patient perfectly at his ease, with no fear of slipping instruments or of impingement on a nerve. He

will always do just what he promises to do, in an examination or operation—never attempting to perform an act by stealth or deception. A knowledge of temperament, in short, will give the dentist an insight into human nature in all its moods and requirements, and, at the same time, impress upon him the importance of respecting the tendencies, tastes, and prejudices of his patients. He will ever remember that, while he is observing them, they also are studying him. Many a dentist has failed to win success, not on account of inability, but because he did not recognize the fact that, coming as he does into such close relationship with each patient, he did not treat them with purity, gentleness, patience, and respect. Some dentists are actually uncleanly in their offices, instruments, spittoons, habits, hands, finger-nails, teeth, hair, beard, breath, body, and linen. Some are rough and impatient, or exhibit manifestations of temper, caused, it may be, by the nervousness or unreasonableness of a previous patient; while others are inquisitive and gossiping, and too frequently obtrusive in matters of opinion, criticism, taste, party or creed. In appropriate conversation, however, suited to the temperament and the education of the patient, the dentist has an opportunity not only to magnify his profession, but to prove his culture and reading; and should not hesitate to improve it. He should aim to represent the advanced standard of dental science, which embraces a sphere of knowledge fairly entitling him to rank among the liberal professions. In short, he should so study men and himself as to be able to treat, upon a knowledge of the temperaments and of general practice, all who require his services, and, at the same time, to command their respect and esteem for him as an intelligent gentleman.

USES OF IODINE PREPARATIONS IN DENTISTRY.

BY GEO. T. BARKER, D.D.S.,

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Among the valuable agents which in the last few years have been introduced to prominent notice in dental practice, iodine preparations deserve especial mention. As an elementary body, iodine is found widely diffused in the vegetable and animal kingdoms, being abundant in sea plants, and, to a moderate extent, in land plants. It is present in considerable quantity in shell-fish, sponges, and all sea animals, moderately in the lower animals, and in the human economy; and, to some degree, in the fluids we drink, air we breathe, and food we eat. It may be considered that its presence is absolutely necessary for the preservation of health, and it is doubtless due to the action of this agent, to a considerable degree, that rapid recoveries from disease occur at the sea-side or from sea-bathing. Iodine is readily absorbed into the blood, where it exists in a state of saline combination. Locally, iodine preparations act

as stimulants, irritants, and moderate escharotics, producing upon the skin or mucous membrane a dark-brown stain, inducing like creasote a pellicle, due to the union of a portion of the albumen of the tissue with the agent. This stain, if the stronger solutions have not been used, may be removed by washing with aqua ammonia, or a strong solution of hyposulphite of soda. The forms in which iodine preparations are used in dentistry are either as tinctures, ethereal solutions, or in combination with some other agent; I shall refer to only the first two forms, leaving the last named for future consideration. The ordinary tincture of iodine—Tinctura Iodinii of the U. S. Pharmacopœia—is prepared by dissolving an ounce of iodine in a pint of alcohol; but a much stronger solution may be made by adding two or three times the quantity of iodine, agitating the preparation frequently until the iodine is dissolved. The French Pharmacopœia recommends an ethereal solution of the strength of our officinal preparation, but as iodine dissolves readily in all proportions in ether, a strong solution may be made more conveniently than with any other material. I have used with success the following formula: ℞. Iodine, ʒiv; Ether, f℥i.

This is a strong solution, and will cause in most instances destruction of that portion of the membrane to which it is applied; this may be due either to overstimulation, or to disorganization in consequence of union with one or more of the constituent elements of the part. Iodine preparations are especially useful, inasmuch as they act as resolvents, and promote absorption of abnormal material; this is accomplished by stimulating the absorbents to increased action, promoting, hastening, and assisting healthy molecular transformations. Among the most valuable uses for which iodine solutions commend themselves, is the treatment of peridental inflammations. These morbid conditions are characterized by effusions of lymph, serum, or blood, and the ethereal preparation above referred to acts most efficiently by promoting absorption of these products. It also acts, in my judgment, as a counter-irritant, directing the circulation to a neighboring part, while at the same time it modifies in some manner the coats of the circulatory vessels of the inflamed part, arresting the rapid flow of blood therein. In all cases iodine in connection with leeching or lancing will hasten, and in the earlier stages in healthy individuals promote, a termination of the existing inflammation by resolution.

The application of the solution should be made by a camel's-hair pencil, or lock of cotton on an instrument, directly to the gum, on buccal or labial, and palatine or mesial surface, holding the mouth open or the cheek from the part until evaporation of the ether has occurred,—the part presenting a bright metallic lustre.

Another and valuble use of this preparation is for the treatment of aphthous ulcers located upon the mucous surfaces. These usually arise

from some disturbance of digestion and modification of mucous membrane as a sequence, but yield readily to occasional paintings of ethereal iodine solution as above. The action of the agent in this instance is to stimulate the part to healthy action, promote absorption and separation of morbid material, and stimulate the organization of healthy granulations. In ulcers originating from other causes, either specific or non-specific, these preparations will be found advantageous. Not long since I was called upon to treat an ulcer located upon the mucous surface of the cheek opposite superior molar teeth. The ulcer had all the appearance of a specific sore, but being convinced that it was not, I looked elsewhere for its cause. Upon questioning the gentleman, I learned that he was an inveterate chewer of "fine-cut" tobacco, usually holding his "quid" at the point undergoing ulceration. Abstinence from the weed, accompanied with frequent paintings of the part with the ethereal solution of iodine, induced rapid cicatrization of the ulcer. This preparation is also indicated for the treatment of fungous gums caused by inflammations induced by badly-fitting plates, or by clasps or tartar; and which, upon removal of the exciting cause of inflammation, yield to local applications of iodine preparations. As an instance of fungous growth of gums, arising (probably) from badly-fitting plate, I would direct attention to a case in which I was recently called in consultation, where the morbid product covered the whole of the buccal (as applied to the teeth) and labial surfaces of the gums; the teeth absent in superior jaw, teeth and gums healthy in inferior maxillary. The appearance of fungous growth, when the upper lip raised, was of a double lip, of structure thick and dense, having the same appearance that it might be supposed to possess if the artificial plate had been large enough to inclose a portion of the upper lip on its inner surface. My diagnosis of the case was that the growth originated from congestion and inflammation of the circulatory vessels, followed by effusions subsequently organized, and was induced by badly-fitting plate. Treatment recommended—make pressure and support the circulatory vessels by means of a plate, to include the morbid growth, and paint the parts freely with the ethereal iodine solution. The result of the treatment is not yet known; the patient residing in a distant city.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Continued from page 182.)

Bones.—There are but very few pathological conditions of osseous structure which can be considered dependent upon deranged dentition, with the exception, perhaps, of the malformations occurring in the jaws,

as the result of the mutual influences existing between maxillary and dental development.

The occurrence of rachitis, or rickets, has been attributed to the difficult or tardy eruption of the teeth, and although some of the arguments advanced were probably tinged with plausibility, the skepticism of the more moderate and careful theorists and practicalists should, in a measure, limit our opinions, at least within the confines of conservatism. It is possible that the nisus of development may be so monopolized by the rapid evolution of the dental organs and the jaws, that other portions of the skeleton may be deprived, at an important period, of that pabulum essential for their solidification, for chemical analysis has demonstrated in rachitical bones a deficiency of the earthy phosphates.

As the causes of rachitis, we find suggested either diminished introduction, impaired assimilation, or increased elimination of the phosphates; the former opinion is controverted by the large amount of phosphates contained in the articles of food in common use. The latter has been demonstrated to be by no means a universal attendant, and hence we are forced to fall back upon the assumption that some abnormal condition of the assimilative functions precludes the preparation and introduction of those materials subservient to the nutrition of the economy generally, and the osseous tissues specially.

The principal deviation of the chemical constituents consists in an increased amount of water, and "this increase" may constitute a serous mollification of the bones, sufficient to prevent the cartilage and newly formed bone from appropriating a sufficient quantum of earthy matter.

"Altered condition of the food, particularly want of proteinates, and disorders in one or more of the digestive organs, at a period of life in which the organism requires much and appropriate new material, are the prominent first causes of rachitis."

Virchow regards the rachitis, so common among the poorer classes, as frequently due to the absence of proteinaceous substances from the food, be it either breast milk, or artificially prepared nutriments. Numerous instances have been proven by examining the milk of mothers who were nursing rachitical children, which almost universally showed a great deficiency of caseine and the phosphates. We conclude from these facts that deranged dentition and rachitis seldom or never stand in the relation of cause and effect, but more generally their conjoined existence may be referred to the same systemic cause, or the prior one may, by the advent of the second, be aggravated in its extent.

Dental Fever.—The irritation consequent upon tooth protrusion may, instead of limiting its remote effects to one organ or set of organs, so diffuse or universalize its influence as to prove a systemic disturbance, characterized by rigors, followed by heat of the skin, frequent pulse and general weakness, and known, when dependent upon the cause just mentioned, as dental fever.

The query very naturally arises, what is fever, and how is it induced? Our answer to such a question will prove at best but very vague; but assuming that such an aberration arises from nervous irritation, originated in the jaws, we can understand how, through the immense, continuous, and intricate network of nerves it is diffused over the entire body.

A number of theories have been advanced to explain the phenomena witnessed, one of which runs thus: It has been demonstrated that certain nerves preside over and regulate, as it were, the functions of certain parts—for instance, the pneumogastric regulates the action of the heart, the splanchnic nerve similarly commands the abdominal viscera, the sympathetic, the action of the salivary glands, etc. Now, if through transmitted impressions the normal undulations of this controlling nervous matter become deranged, we have functional action impelled at a furious rate, the disintegrative is more rapid than the integrative force, and we have the manifestation of accelerated combustion or breaking down, viz., heat, thirst, dryness of the skin, etc. Says Dr. Wood: "Fever is an acute affection of the system, in which all the functions are more or less deranged; the most striking phenomena being sensorial or nervous irregularity, increased frequency of pulse, increased heat, and disinclination for food." Professor Schiff, of Switzerland, has lately produced a new theory upon this subject. He regards the chill and heat as entirely independent of each other, ignoring the idea that the latter is the result of reaction. He has discovered in the vaso-motory nerves, both contracting and dilating fibres, and has demonstrated that the cutting of the entire nerve necessarily paralyzes the dilating fibres, and hence no congestion can ensue: when, however, the dilating fibres are irritated, an engorgement of the vessels follows; consequently, he assumes that both the hot and cold stages are active conditions, the chill depending upon the action of the contracting, and the fever upon the action of the dilating fibres of the vaso-motory nerves.

Now, upon this theory the explanation of dental fever would be as follows: from an hyperæmic condition of the gums, jaws, and pulps, and concomitant irritation of the local nerves, the remote effects are conducted to the nervous peripheries, first affecting the contracting, and next the dilating fibres. In some instances, however, the derangement is initiated with the fever, and the absence of the chill accounted for upon the ground that the contracting fibres have escaped implication.

The theories entertained upon the cause and nature are too numerous and prolix to invite attention: some found it dependent upon humoral origin; others believed it attributable to nervous derangement; while, again, the local causes found their advocates, and among these was included, prominent, Professor Chapman, who traced most fevers to an original morbid impression upon the stomach.

To my mind, the theory which covers the greatest number of facts, and combines simplicity with comprehensiveness, is the one to which I directed attention, when upon the subject of development and nutrition. It is this: a cause operating to interfere with nutrition in any part will produce fever, which, if slight, will be confined in its effects. If, however, the impression is sufficiently forcible to make its influence felt at distant points, or if by constancy it aggregates in strength, then we have more extended or general fever—in other words, recognizing that the integration and disintegration of tissue constitute nutrition, and that it is sustained and regulated by nerve force, we can appreciate how any interference with the normal nerve undulations will derange these operations, and destroy the equilibrium which formerly reigned between the two actions, giving to the destructive force the ascendency, and thus generating the heat so characteristic of febrile condition. Now if this exalted action should, through any favoring or inviting condition of an organ, concentrate thereupon, we may have an effusion taking place, and when such a result supervenes upon the surface of a confined and vital organ like the brain, we have all those alarming symptoms indicative of "acute hydrocephalus."

Fever, from assuming different degrees of rapidity and intensity, is divided into two classes: the acute and chronic or typhoid. In one, as the name would suggest, the action is quick and inflammatory in its character; in the other it is moderate, and the accompanying symptoms sluggish, and slowly consuming in their nature.

From the researches of experimental physiology we learn that there are two sets of nerves, as distinct in their origin as their function: one, the cerebro-spinal, presides over special and general sensation and motion; while the sympathetic or great ganglionic systemic is chiefly concerned in regulating the functions of organic and vegetative life, and although occasionally manifesting motor and sensory functions from anastomoses with spinal nerves, it is found, when exclusive, to control, regulate, or suppress, within normal limits, functional action.

We infer from this fact that acute fevers are referable to abnormal excitation of the cerebro-spinal system. The symptoms confirm us in our belief, and we administer remedies calculated to *reduce* the action, such as narcotics, sedatives, derivants, refrigerants, diaphoretics, etc., etc. When, however, the reverse condition prevails, we regard the sympathetic at fault. From inability to antagonize the cerebro-spinal forces, nutrition is accelerated; but from the fact that, at the same time the digestive and assimilative functions are disorganized, the fuel or pabulum is deficient and not present in sufficient quantities to sustain vigorous combustion; hence the slow and depressing nature of the disease, which demands tonic and stimulating treatment to restore the strength and dominion of the "great sympathetic."

This theory seems to present a consistency with facts, and as the theory is framed to interpret facts, we are justified in accepting that which is the most comprehensive in its principles, but culpable if we endeavor to torture facts into accordance with theory.

Dr. Wood designates as "Irritative Fever" all cases of idiopathic fever resulting from causes of irritation, having nothing peculiar or specific in their mode of operation.

Says Dr. Richardson: "I do not think there is any case of dentition which is altogether unattended, throughout its whole course, by systemic disturbance. In some cases, truly, the disturbance is so trifling that, as Mr. Fox remarks, the teeth appear without the nurse or mother being aware of it, but this observation must surely refer to the first two teeth, and not to the whole set. Any way, there is set up, previous to and during the evolution of the deciduous teeth, an almost invariable train of febrile symptoms, which may be mild and simple or may be severe and complicated, and to which the name of 'Tooth Fever' is often applied."

In the vast majority of cases the febrile movement is of but little moment and readily dissipated, but in some instances surgical interference alone will not arrest the difficulty, when we are obliged to conjoin with it systemic treatment. It is unnecessary to enter into a detail of the various measures, but I will merely call attention to the importance of anticipating, by every possible means, the occurrence of cerebral inflammation where the general conformation of the head and associated conditions would lead to fears of such a complication. Active cathartics, diaphoretics, and the warm bath are all efficacious, and in severe cases should be accompanied by cooling applications to the head, and the local or general abstraction of blood.

Nervous System.—From remarks already made we can readily understand that, from anatomical and developmental peculiarities, the nervous system of the infant is particularly liable to involvement from slight causes, and hence at this period of life we find prevalent such affections as meningitis, hypertrophy, apoplexy, and hydrocephalus.

We are made aware, through careful experimentation, of the relative growth of the infantile brain and cranium at different periods, and the information thus elicited shows that the cranial bones are divided by sutures until the twentieth year, and that a premature or congenital ossification may give rise to serious consequences by suppressing the development of both the brain and skull.

The weight of the head of the newly-born amounts to about one-fifth the weight of the whole body. "The anterior lobes of the large hemispheres are small in proportion to the bulk of the brain, the cerebellum is small in proportion to the cerebrum. Both the anterior lobes of the large hemispheres and the cerebellum grow more rapidly in early

infancy than the generally rapid development of the infantile brain would explain. The brain itself grows most at the same period, in proportion to the other organs of the body. There is little cortical, gray cerebral substance, and not the distinct difference between the gray and white substances noticeable later in life."

From these facts we should infer that at birth the intellectual faculties and the power of co-ordinating movements would be but faintly pronounced, and the connecting central counterbalancing portions of the brain but rudimentally formed. With the intense growth of the parts previously mentioned, that is, the anterior lobes of the large hemispheres and the cerebellum, we find their irritability evinced by a tendency to abnormal and irregular, rather than physiological action. When we recall that, superadded to these causes, we have those gigantic changes progressing which effect the development and evolution of the teeth, sufficient explanation is afforded of the frequency of cerebral hyperæmia during early infancy, and particularly at the period of first dentition.

It must not be inferred that abnormal states of dentition universally occasion serious disorders, for the results are modified by constitutional vigor, temperament, idiosyncrasies, the observance of cleanliness, and atmospheric conditions. Consequently the country practitioner, unless practicing in a malarious district or otherwise unhealthy locality, will testify to the innocent nature of abnormalities in development, from the energy which a pure and invigorating atmosphere communicates to the nervous system, thereby enabling it to resist the depressing influences of perverting forces. In large cities, however, the verdict will be very different; here the strengthening influences referred to are so contaminated as to serve an opposite purpose, and, by reducing the vital powers, facilitate the inroads of prostrating diseases.

It has hitherto been supposed that existing disease could not be justly attributed to dental irritation prior to the cutting of the teeth, yet it seems rational to assume that a turgid state of the dental matrices may even at very early periods occasion irritation, which, by transmission through the sensitive branches of the fifth pair, should so extend through the continuous nervous tissue as to occasion general convulsions. The following case, related by Ashburner, would corroborate this view: "A fine, healthy-looking child of a strong Irish woman died at thirteen weeks of age, of a convulsion fit. My suspicions as to its having had improper food were not well founded. The mother was anxious to have the cause of death ascertained, and I found no difficulty in obtaining leave to open the body. The organs, for the most part, were healthy; the stomach contained only a little milk; skin and mucous surfaces of the intestines perfectly healthy; the contents of the thorax, as well as those of the abdomen, were quite healthy; in the head there

was a slightly injected state of the vessels of the pia mater, but in other respects the brain was quite healthy; the capsules of the incisor teeth were large and very vascular, much more advanced than usual. With a lancet the cartilaginous rim of the lower jaw was attempted to be removed, with a view of exposing the capsules of the molar teeth, but these were so unusually distended with fluid that the instrument cut into them and let it out. This was an example of development proceeding too hastily."

When the irritation threatens an occurrence of convulsions, premonitory symptoms are observed, as a costive condition of the bowels, disturbed rest, frightened dreams, grinding of the teeth, corrugation of the brows, etc.; these are succeeded by gastric irritability and vomiting, the muscles of the eye and face suffer spasmodic twitchings, and ultimately such mild manifestations merge into general convulsions. Says Dr. John Clarke: "A bending of the toes downward, clinching of the fists and insertion of the thumbs into the palms of the hands, and bending the fingers upon them, is sometimes found not only during the paroxysms, but at other times. Clinching the fist, with the thumb inserted into the palm of the hand, often exists for a long time in children, without being much observed; yet it is always to be considered an unfavorable symptom, and frequently is a forerunner of convulsive disorders, being itself a spasmodic affection. It rarely happens that a child recovers from an attack of this sort, unless the progress of the disorder has been interrupted by a timely application of proper remedies, without a general convulsion."

It is conceived that chorea and epilepsy are but convulsions of a severer degree, and it requires no great stretch of the conception to believe that *paralysis*, from effusion or acute hydrocephalus, is the result of the same causes, of increased intensity.

The convulsive movements are frequently limited to one or more localities, as the rectus internus of the eye, the abducens, the oculomotory, the motory portion of the fifth, facial, and hypoglossus nerves, and not unfrequently to a few fibres of the spinal nerves, causing contractions of the gastrocnemius. How these results are occasioned is a direction in which our information is mainly speculative: that there is some aberration in the nervous fluid is evident, but their particular nature has thus far eluded the closest scrutiny. From the absence of any structural lesion, we are led to infer that the difficulty is in the contained rather than the container; or, in other words, in the nervous fluid, and not in the elements of nerve substance. Not unfrequently the brain and nervous system present no traces whatever of disease, but occasionally hyperæmia, effusion of serum beneath the membranes, or partial softening are observed. It becomes a question, however, whether they should be viewed in the light of causes or effects, and the history

of the case only will enable us to determine whether the source of disease be central or peripheric, but will not enlighten as to the nature of the nervo-muscular manifestations.

Spasm may result from irritation applied to any portion of the tract of nerves; and associated as the fifth pair is with the great sympathetic, how can we limit the extent of convulsive contractions produced by the irritation of a dental filament? The parts mostly subject to convulsive movements are the eyes, the muscles of the face, the superior and inferior extremities, and those of respiration; the parts may be independently affected or associately involved, but generally suffer more upon one side of the body than the other.

The convulsions are mostly attended with foaming at the mouth, hissing respiration, rolling of the eyes, contortion of the features, backward bowing of the trunk, livid countenance, distention of the jugulars, grinding of the teeth, profuse perspiration about the head, etc.,—these in combination with other symptoms vary in violence and duration in different cases;—in one the muscular action may be vibratory or trembling in its nature, while in another the most rigid and forcible contraction of the limbs is observed; and so in one case the paroxysm may continue for but a few hours, while in others it may be extended to as many days or weeks.

In violent cases death may occur during the paroxysm, from acute hydrocephalus or asphyxia, but more frequently the crisis is marked by epistaxis, diarrhœa, or vomiting.

From post-mortem investigations nothing has yet been derived sufficiently definite to indicate a specific plan of treatment. The lesions of the brain and spinal marrow, already referred to, have it is true been found by many good pathologists, while those quite as good have as often searched in vain; hence, without any clear guide, we are left to depend upon our diagnostic skill in seeking the cause.

There are many influences capable of injuriously affecting the excitable nervous centres of infancy; but prominent among these we may place dentition. Says Dr. Condie: "The first few weeks of the infant's life, the period of weaning, and that of dentition, constitute the stages of infancy at which convulsions are most likely to occur." "Difficult dentition is unquestionably a frequent cause of convulsive attacks. A child has been known to suffer from the time it first begins to cut its teeth, with repeated paroxysms of convulsions, in consequence of which its life has been despaired of from day to day, and from week to week; yet, after the lapse of several months, has recovered completely, upon the appearance of the first molar teeth."

The treatment of convulsions will of course be variously modified by the peculiarities of different cases; but if dental irritation be found the excitant, its removal or amelioration is of course the first thing demanded,

after which the usual treatment adopted in such cases is applicable, as the abstraction of blood from the arm by the lancet, or from the temples or behind the ears with leeches, the administration of active purgatives, or, if the jaws be set, purgative enemata, applications of cold to the scalp and spine, stimulating pediluvia, warm hip bath, the inhalation of chloroform or ether, or, in other words, all measures calculated to soothe the nervous batteries. When convulsions are threatened, compression of the carotids has been advised and practiced in several cases with success. From the statement that convulsions will frequently terminate in an attack of vomiting, we receive the intimation that an irritation of the stomach may be the exciting cause, and this not unfrequently consists in the presence of undigested and irritating aliment; hence the timely administration of an emetic will often abort or curtail an attack.

(To be continued.)

PARTIAL SETS OF TEETH.

BY J. A. PERKINS, D.D.S., AMESBURY, MASS.

We have been very glad to notice of late the very general discussion that has arisen in relation to partial sets of teeth, and the different modes employed in retaining them in the mouth. We repeat what we stated in a former article (and we beg pardon for intruding so soon on the same subject), that we think there still is room for *great improvement* in this department of dentistry.

Nearly ten years ago we were admitted as a student in a Boston dental office, the occupants of which stand in the front ranks of the dental profession, and, beside a large practice in operative dentistry, they also made a *specialty* of inserting *partial sets* of teeth on gold. Making their own teeth, they generally retained them by the use of clasps, and during the year we were in the office, we do not know of a *single instance* where the *standard clasp* was not used, and is, to this day, with constantly increasing success.

We are somewhat familiar with the different modes of practice in Philadelphia and other cities, but we know of no work that commands so high a price, or gives such universal satisfaction, as the standard clasp. So far as our own practice is concerned, we *always* employ it if we use any clasp. We do not propose, at this time, to "review" the late discussion, reported in the "Proceedings of the Odontographic Society of Pennsylvania," on "the relative merits of clasps and atmospheric pressure, for retaining partial plates."

But we firmly believe the happy day will arrive when the plate for a partial set of teeth will be properly formed and cut away, so as not to allow the clasp or plate to create any irritation, either round the teeth

or anywhere else. We say that, when that day arrives, "*half-round wire*" will not have to be recommended or used.

Indeed, we have faith to believe that, in less than five years, there will not be found a single professor, connected with any of our dental colleges, in all America, who will care to repeat the *startling announcement* we find chronicled on page 192 of the April number of the DENTAL COSMOS, as follows: "The standard clasp has, perhaps, some little advantage, *but could seldom be used.*"

HOW TO "TRUE" A CORUNDUM WHEEL.

BY W. E. DRISCOLL, BEDFORD, INDIANA.

PRESUMING that many have been annoyed in getting corundum wheels to run true, or to give them an even surface when rough, each indispensable in making good joints, I offer the following suggestion: The wheel being adjusted to the lathe, revolve it very fast, holding a piece of corundum stone against the uneven or wabbling surface, and in a short time you will find the *piece* melting and uniting with the wheel, so as to make it perfectly true in all respects.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

THE regular monthly meeting was held in the Philadelphia Dental College, No. 108 North Tenth Street, Wednesday, April 7th, 1869, the President in the Chair.

Chas. E. Pike, D.D.S., and Alonzo Boice, D.D.S., who were proposed at the last meeting for active membership, having been favorably reported upon by the Executive Committee, were unanimously elected.

A letter from Dr. B. F. Arrington, of Wilmington, N. C., was read, and, upon motion, was ordered to be entered upon the minutes. The following is a synopsis:

"I have recorded a case of practice, which to me has been very interesting and instructive. * * * If you deem it of sufficient interest, you can relate it at the next meeting of the Odontographic Society. The case was new to me, and was treated experimentally.

"Ten years ago, September past, I was requested to call upon a lady residing in the country, and in too feeble health to visit my office; was recovering from a long-protracted case of typhoid fever, and ill effects following. Nearly eight months had elapsed since she was first attacked

with the fever, which confined her to her bed nearly two months. Health, prior to this illness, always excellent from childhood; dental structures well developed and perfect in quality. The object for desiring my presence was to consult me relative to the removal of all the teeth, and the insertion of artificial substitutes. The disease and medical treatment had, to all appearances, played havoc with these organs; they were all very dark in color, and defective in texture. Acids had been administered freely, without caution as to injurious effects. * * * After having advised the retention and treatment of the teeth, * * the question arose with me how to treat, what for, what with, etc.

"My first idea was to improve the appearance with stick and pumice, or silex, not having tested thoroughly the true condition of the enamel. I commenced the operation of polishing in the ordinary way, but was very soon disgusted with the slow progress and want of success.

"After a more careful diagnosis, I found almost the entire enamel in a softened, chalk-like state, and some of the teeth (7 or 8) were sensitive to the touch." * * * Finally concluded to experiment with some of the superior incisors. * * * After separating with a thin, sharp file, followed with fine grades, much worn, then tape, pumice, silex, and finished with burnishers. The outer and inner walls I pared off with cone-shaped chisels and excavators, using them freely, so long as any soft portion of enamel remained, and smoothed as before. The superior cuspidati were very painful when the instruments were applied, but this was easily relieved by the application of nitrate of silver (stick).

"The experiment proved a success and gave encouragement to both patient and operator. * * * I proceeded, at intervals, for three days, dressing as at first; the lunar caustic never failed to give relief, and time has proved that it did no injury.

"The walls and portions of the grinding surfaces of some of the bicuspids and molars were seriously affected; these, in addition to the process before described, I brushed with the polishing materials.

"Advised equal portions of pulverized silex and prepared chalk to be used freely for four or six weeks, after which the use of ordinary tooth-powder was sufficient.

"Prescribed a dilute tincture of arnica, to be used several times per diem, and pressure on the gums with the finger, to be regulated according to their condition.

"After several days had elapsed, I was notified that the lady was suffering very much from the tenderness of her teeth. This was giving her trouble, both from touch and any change of temperature. * *

"Upon investigation, found the teeth previously cauterized were not at all sensitive, and consequently treated them all in this way.

"About five years after date of treatment, I met my patient, with her health perfectly restored, and the teeth were, to all appearances, as per-

fect and free from defect as could be desired. She assured me that she had not experienced one moment's discomfort with these organs, since my last application of the nitrate of silver. At conversation distance, no one could detect the loss of enamel.

"About three weeks since I met with the husband of this lady, and questioned him concerning the present condition of her teeth. He informed me that they looked very well, and he presumed they were so in reality, as he had not heard any complaint about them.

"So was treated and so terminated one case. I now have two patients (first cousins, male and female) under treatment for the same condition in a modified form. * * *

"The matter of surprise to me, in the above case, is that none of the teeth have decayed since recovery from the typhoid fever, contrary to the almost universal experience—I mean an extra degree of decay, more than follows any other disease." * * *

Dr. Nones, in commenting upon the treatment described by Dr. Arrington, said that he had, for some time, been in the habit of using the fused nitrate of silver for obstinate cases of sensitive dentine, and had yet to meet with discoloration resulting from its application at his hands. The first patient for whom he had tried it was a lady of about twenty-nine years of age, of bilious temperament. She complained of exquisite tenderness of the central incisors,—the approximal surfaces of which had been filed to fit an artificial denture; the enamel having been removed, thereby exposing the terminal points of the tubuli, where it is customary to find the teeth so sensitive: this is especially noticed by the operative dentist, when cutting retaining points for fillings.

Having used the various remedies recommended as having the desired therapeutic properties, such as chloride of zinc, etc., all with but little or no satisfactory results, he dried the parts and surrounding tissues thoroughly with cotton, and guarded by dry napkins, to prevent the solution from running over any but the points affected; he then slightly moistened a stick of lunar caustic and rubbed it upon the denuded dentine, which treatment gave relief.

Since the trial in this case, he had frequently used it in a similar manner, in an extended hospital practice that he had followed among persons suffering from various mental disorders, whose nervous systems were all more or less injured by their disease. He had the pleasure of stating that success followed in every particular.

Dr. Stellwagen—The cause, effect and treatment of sensitive dentine, although most important matters for investigation, and, from universal daily occurrence, the most frequently met with, of the many annoyances to the dentist, are yet the least thoroughly understood. A whole evening might be profitably spent upon the theme. He had not found any specific among those remedies vaunted as such by some

of the members of the profession. The fact of so large a number of articles being employed and recommended for this purpose, was quite enough to show how much we are at a loss to cure, by any simple means, this painful condition.

Pretty much every remedy ever mentioned had been used by him, excepting the nitrate of silver, and this, from its well-known staining property, he had feared to use upon tissues so slowly replaced as those of the dental organs. On the soft parts of the mouth, where the mark left is only transitory, he had frequently used it; but preferred the chloride of zinc, for obtunding sensibility and stimulating the gums to grow around the necks of denuded teeth. A formula like the following had answered well in some cases:

Zinci chloridi, grs. x;
Aquæ Destillatæ, f℥j.
Fi. sol.

It is used by soaking a piece of raw cotton in it, brushing lightly over the gums and around the necks of the teeth, three or four times daily for a month or so. Of course the salivary calculi must be removed and the denuded portions of the teeth kept perfectly clean. He requested gentlemen to experiment with this and to report upon it at some future meeting. The success met with from its use in practice led him to advise others, as he himself had been, to try before condemning it.

It would now be his purpose to investigate the effects of the nitrate of silver; at one time he had thought of applying it to the teeth of one of the lower animals; but the only thing that it would be likely to show there would be the discoloration and softening, if any followed.

The distilled water in the above prescription might be perfumed, to make it more agreeable.

If but one well-authenticated case of discoloration of the dentine was reported, it should be received with all the weight accorded to positive in contradistinction to negative testimony.

In using this remedy, he thought it would no doubt be well to wipe it off carefully with bibulous paper (it discolors like indelible ink, and would ruin the appearance of a napkin), and then wash with water, finally removing, as far as possible, every trace of it with some alkaline fluid, as the aqua ammoniæ. This should be done to save the teeth and the instruments from the effect of the nitric acid.

Dr. Breen said that he had on one occasion used the nitrate of silver, and had had considerable discoloration result almost immediately, but he could not answer as to its permanency.

The patient, who had just met with the accident, had some of the incisor teeth fractured so severely as to expose the pulps, which were highly sensitive and bleeding at the time he first saw them. The

lunar caustic was employed to serve as a styptic and obtund the sensibility. He noticed that the small portions of teeth left standing above the gum became darkened, but as the patient did not again come under his care, he could not give any further history. He considered the discoloration due to the solution getting into the mouths of the tubuli, and thus saturating the dentine.

Dr. Eisenbrey had used the following solution with success, in cases where the gum had receded, leaving the necks of the teeth exposed and exquisitely sensitive:

℞.—Argenti nitratis, gr. ij;
Aquæ dest. f℥ss.
Fi. sol.

He applied it liberally with a camel's-hair brush, and, after a short time, burnished the parts well. The burnisher alone was first tried, but had not succeeded. Sixteen months after this treatment he saw the patient, and, up to that time, there was not the slightest trace of discoloration. With his experience he deemed it to be safe and effective; he continues to use it at the present time, and in his own mouth, for the same purpose. For the past three years had *personal* as well as *general* experience in its efficacy in treating aphthous ulcers of the mouth—there the benefit derived was instantaneous. Had a patient to return periodically to have these ulcers touched, and finally he gave him some of the solution and a brush to use when occasion required,—this being a *reliable* patient, and knowing that he would not be lost sight of in case any discoloration should occur. Neither his own teeth nor those of his patients had suffered in the slightest degree from the use of the above solution,—could not say what effect a saturated solution would have.

Dr. W. H. Trueman exhibited to the society a number of specimens of porcelain teeth, of French manufacture, at least half a century old, with the semi-cylindrical groove, and tips of platina plate in the place of the usual pins. Although made of the out-of-date *clay* body, some of them presented quite a bony appearance.

Also, several cases of the same teeth, mounted; one, of four incisors on platina, with very narrow gold clasps around the canines and first bicuspids; another, with the two centrals and a canine on each side, the teeth soldered on small platina plates united by delicate bands of gold wire. This case was some fifty or sixty years of age, and had been worn for many years. Also several single teeth of a later date, all made in Europe, rudely mounted on gold, silver, and palladium. One held in by a pivot and two bands.

Several partial sets of natural teeth, mounted on very narrow gold plates, in various ways. All of them in their day had done excellent

service. Several old and rudely-shaped pivot teeth, one partially finished, carved from hippopotamus tusk. Several plain vulcanite teeth, English make, remarkable for their dense bony appearance. Also a specimen prepared by him some five years ago, intended to represent the natural gum, in rubber. Equal parts of American red and English light pink rubber were cut very fine and intimately mixed with the scissors. When vulcanized and polished, it has a mottled appearance, imitating the gum much better than a solid color. Also a lower case of eight teeth, cast in block tin on a silver plate, made *heavy* for a patient who had difficulty in keeping an ordinary case down. It was loaded so effectually that, when inserted, the patient was *unable* to raise the lower jaw;—weight nearly 40 dwt.

The doctor also exhibited a cast of the lower jaw with *five* perfect incisors, forming a *perfectly regular arch.* Another, in which two upper molars of the right side are in the natural position, while the third is between and entirely outside. Another upper cast, with the right canine between the bicuspids. Also two casts illustrating a complicated irregularity case. One taken three years ago, showing the teeth very much crowded and out of position, the centrals standing at right angles with each other. The other taken recently, showing a well-formed arch, with every tooth in position. In order to obtain room for the front teeth, the two bicuspids on each side had to be moved bodily, at least one-quarter of an inch.

Dr. Long had with him three antiquated specimens of mechanical dentistry, belonging to Mr. J. C. Lund. One of them with natural teeth riveted on a piece of gold wire, and secured by clasps to a molar on each side, was found in an old house in New York State. A lower set made of bone, molars and bicuspids, carved incisors, and cuspids of porcelain. A rubber set, with molars of the same material, both made in Paris.

Prof. McQuillen then said:—Under the impression that it would be of interest to the members of the society, I have placed on the table for microscopical examination a number of specimens of the trichina spiralis, which I have prepared from the semitendinosis muscle of a woman, furnished to me by my friend, Dr. R. J. Levis, one of the surgeons of the Philadelphia Hospital. The patient from whom the muscle was obtained died in that institution during the past winter, with every evidence of phthisis pulmonalis. Dr. Huff, a resident physician in the institution, in making an autopsy of the body, observing a number of calcareous points in the muscles, subjected them to microscopical observation, and discovered the presence of the trichina; this being the first time that these parasites had been observed in the remains of a human being in our city. Since that, another patient, who died in the same institution, was found, on examination, to be similarly affected. Several

deaths have also been reported as occurring in New York, from trichiniasis (the term applied to this disease), in one instance four members of a family died from this affection. In all these cases, if the testimony given is to be relied upon, the deceased were in the habit of eating uncooked pork, in the form of smoked or dried ham, or sausages. It would thus appear, that either these parasites are on the increase in our country, or their presence in the human body here is becoming recognized by our microscopists. It is reasonable to infer the latter conclusion is the correct one, and that patients have not unfrequently died, with symptoms which have been attributed to other causes, that have actually had their origin in these parasites. In Germany, as you are well aware, the diseases induced by the presence of these parasites have been of an alarming and fatal character, and the mortality has assumed the proportions of a pestilence at times. Recognizing the origin of this affection from the eating of pork infected with the trichinæ spiralis, municipal regulations have been established, in many if not all parts of Germany, making the microscopical examination of pork offered for sale in the markets obligatory upon the dealers, with a view of protecting the community from this fearful scourge. In course of time it may become necessary for us to adopt similar precautions. It is some satisfaction to know that, although the parasite will continue to live in a state of dormant vitality in the encysted condition for months, if not for years, in pork preserved in the form of dried or smoked hams, or sausages, cooking, *i.e.* boiling, roasting, frying, etc., is destructive to the life of the animal.

During the past three months much of my leisure time has been devoted to the preparation and microscopical examination of the trichina, having mounted some fifty odd specimens in that time, and although it has been a subject of much interest to me, I cannot claim to have anything of importance to add to the literature of a subject, which has been so carefully investigated by Professors Owen, Leidy (who was the first to observe the trichina in pork), Virchow, and others. I have noticed, however, one point which has impressed me as somewhat singular, that on placing portions of the muscle under examination, in the carmine fluid prepared according to Beale's direction for staining tissues, whilst the muscular fibre readily absorbed the coloring matter, the trichinæ were unaffected by it. This can be readily demonstrated under the microscope, by forcing the trichinæ out of the cysts, with slight pressure on the thin glass. When I first observed this, supposing that the non-coloration might be due to the calcareous walls of the cysts being impermeable, the specimen was re-immersed in the carmine fluid, and left there for about ten hours, when it was again placed under the microscope, and the trichina still found unaffected by the coloring matter. The specimens on the table were in the carmine fluid for a period

of three weeks, and you will observe that, while the muscular fibre is stained a brilliant carmine, the trichina, unencysted, and in the immediate vicinity, but free from the muscular fibre, has not the slightest evidence of coloration in them. I do not wish to be understood as asserting that it is impossible to stain the trichina, but merely directing your attention to the somewhat singular fact, that notwithstanding the prolonged immersion in the carmine fluid, the muscular fibres should be so readily stained—a quarter to half an hour sufficing for that—while the parasite is unaffected by it. It may possibly have no significance, but it certainly affords an excellent method of demonstrating the trichina when forced from its cyst, on account of the difference in color between it and the muscular fibre. These specimens were taken from the carmine fluid and mounted at once without any preliminary washing.

Dr. Lionel S. Beale lays great stress upon the use of the carmine fluid in defining the difference between what he calls *germinal matter* and *formed material*; stating that the first absorbs and retains the carmine, whilst it can be readily washed from the former. What connection this may have with the trichina, so far as this division of organized structure is concerned, is a matter about which I do not feel called upon to express any opinion. The specimens which you will examine, under an eight-tenth objective, have been mounted in pure glycerin, which is an excellent menstruum for showing them, and much more agreeable to manipulate with than Canada balsam.

The specimens were then examined under the microscope by the members.

The Recording Secretary notified the gentlemen present that, the next being the annual meeting, the business brought before it would be a revision of the Constitution, so as to make it correspond with the requirements of the State Dental Society of Pennsylvania. The customary reports of the officers, and the election of the incumbents for the following year, would prevent there being any subject for scientific discussion, unless urgent.

The society then adjourned to the regular day of the annual meeting, the first Tuesday in May (4th).

CHICAGO MICROSCOPICAL CLUB.

BY HENRY F. MONROE, SECRETARY.

The monthly meeting of this club was held on the evening of March 23d, 1869, at the office of the president, Dr. W. W. Allport.

Most of the members and several invited guests were present.

Communications were received, with contributions, from Prof. J. H. McQuillen, of Philadelphia, and R. A. Smith, of Fond du Lac. The communications were placed on file, and the secretary was instructed to acknowledge the donations with thanks.

J. A. Briggs, Esq., was elected Curator and Librarian for the current year.

The Curator then placed on exhibition the slides from Prof. McQuillen, which consisted of four mountings of trichina spiralis, showing them in various stages—(from which the accompanying illustrations were drawn)—one with the muscular fibre stained by means of Beale's Carmine Fluid, and the trichina unaffected by the coloring fluid; also a transverse section of the poison-fang of a rattlesnake.

The President, Dr. Allport, remarked, in substance, that as some of the gentlemen present might not be well acquainted with what has been written in regard to the trichina spiralis, it had been suggested that a few words of explanation, in relation to what is known about this singular parasite, would not be inappropriate before proceeding to examine the preparations now before us.

The trichina spiralis, or what is popularly known as trichinæ, belongs to the class worms. It was so named by Prof. Owen, the celebrated comparative anatomist of England, from the Greek word *trichos*, a hair, on account of its very small and attenuated form, and the coiled-up condition in which it is usually found. Its body is exceedingly slender, and it seldom grows to more than one twenty-fourth part of an inch in length. Being, too, one of the most transparent of animal bodies, and interposing but slight obstruction to the transmission of light, it is difficult to be seen, except when under the microscope.

Many suppose that the existence of this parasite within the human body, or at least the discovery of it there, is of very recent date. Such, however, is not the fact, for it is now nearly fifty years since this discovery was first made. The subject in former years attracted but little attention, either from the medical profession or from scientific men, from the circumstance that only within the last few years has its presence in the human body been known to endanger life. So soon, however, as it became known that human life was in danger from this cause, and that the terrible trichina disease, in some cases, swept with pestilential fury over entire communities, scientific men of all classes began their investigations, with a view not only to ascertain the origin and habits of the animal, but also to discover, if possible, some method of eradicating it from the human body.

As is usually the case in the investigation of most new subjects, so in this many false theories were advanced, to be set aside by further research. But the opinion I believe now generally entertained by those who have most thoroughly investigated this subject is, that trichinæ are never found in the human body unless first taken into the stomach in the food eaten, and that this very rarely, if ever, occurs, except by eating the flesh of swine.

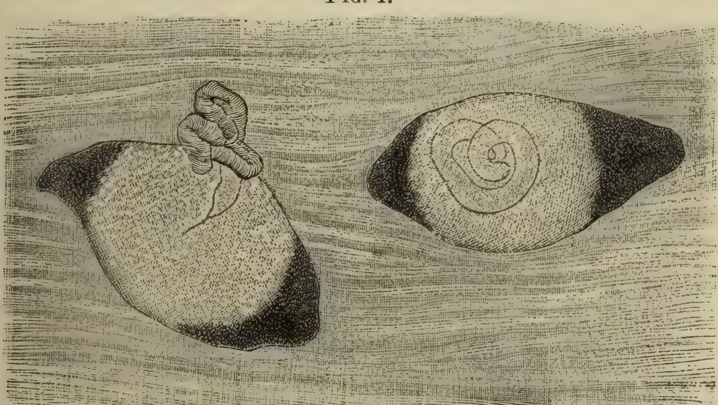
Accordingly, careful investigators doubt whether genuine trichinæ,

in any case, have ever been found in the flesh of living animals, either of the sheep or bovine species. That they may be found sometimes in the flesh of these animals after they are killed is possible; but this, it is believed, must be caused by its being placed in immediate contact with infected meat, while in the butchers' stalls.

The manner of their propagation within the human body is somewhat singular. It is supposed that the trichinæ, taken into the stomach with the food, never enter the muscles of the body. These trichinæ become separated from the food in the process of digestion, pass down into, and adhere to the lining membrane of the intestines, and breed there. Their young perforate the walls of the intestines, and make their way into the various muscles of the body, dividing and irritating the fibres as they go, no muscle being exempt from their ravages except the heart.

In one of the preparations now to be submitted to your inspection, within a piece of muscle not one-quarter of an inch in square surface, and probably not exceeding a thirtieth part of an inch in thickness, you will see some half dozen trichinæ; and if so many of these are found in such a small piece of flesh, it is evident that an ordinary mouthful of infected meat might contain thousands of them; and as a single trichina may breed several hundred young ones in a few days, millions of these animals sometimes find their way into the muscles of the human system from eating a single mouthful of infected meat.

Fig. 1.

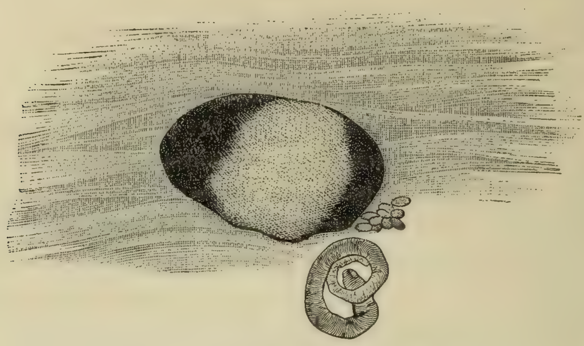


Two Trichinæ, one inclosed in the cyst the other protruding from the ruptured cyst.

Trichinæ are found in muscle under two conditions—free and encapsulated. By free is meant crawling, and eating their way from part to part, but usually working lengthwise of the muscle. In a free state, the body and tail is usually coiled up, somewhat like the mainspring of a watch, or a rattlesnake about to strike—with its head protruding a little; and when in a state of motion, by expanding and contracting its coil, it heaves and surges from point to point in its path of destruction.

With the millions of these little animals, then, sometimes found in the body of a person who dies of the trichina disease, one may almost literally be said thus to die a *living* death.

FIG. 2.



Trichina free from cyst and the muscular fibre.

By the encapsulated condition is meant the state where the trichinæ have ceased to eat the muscle, and have become imbedded or incased in a sort of closed sack, composed of animal and mineral matter. When they reach this condition, it is said that their presence ceases to greatly endanger life; and the patient is regarded as cured, provided no more young trichinæ are propagated within the intestines.

So far as breeding is concerned, it is said to make no practical difference whether the trichinæ, when swallowed, are in a free or encapsuled condition: if free, they pass down into the intestines as before stated; if incased, the capsules are dissolved by the juices of the stomach, and the trichinæ set free and breed the same as if they had never been encapsuled.

Hereupon a member asked whether there had been anything as yet discovered that would destroy these worms, after they had entered the body.

Dr. Allport replied that, so far as he was aware, no remedy had yet been found that would materially affect them after they had once entered the muscle, although it was quite possible that they had, in some instances, been voided from the intestines by the use of powerful vermifuges and cathartics. He had seen, however, no reliable statement that such had been the case.

With regard to the formation of these capsules, two distinct theories have obtained. According to one, the capsule is a deposit, or secretion, made by the animal around itself, when it has reached a certain stage of development, by which it becomes more and more coiled up, and at last wholly relaxed and quiescent, though not dead. The other theory is, that the capsule is a deposit from the muscle, with which deposit the animal has nothing to do, unless it may be to excite

the muscle to action. If the first theory is correct, it would seem that the animal limited its own power for mischief, manufacturing and wrapping around itself its own winding-sheet.

The other theory would seem to indicate that nature, becoming alarmed by the presence of these dangerous intruders, sets to work in self-defense, and throws around, and imprisons it with a wall from which it cannot extricate itself, thus in a great degree destroying its ability to endanger life. To my mind, the latter is the more plausible theory.

Before examining the slides presented, allow me to remind you, as stated in the letter accompanying them, that the three first you will inspect were taken from the muscles of a woman who died in the Philadelphia Hospital, within the last few months, and were prepared and mounted by Dr. McQuillen. The fourth is a foreign preparation purchased by him several years ago, for the purpose of demonstrating the trichinæ spiralis to his class of students. And as we are so apt to think it is necessary to send abroad in order to obtain nicely prepared and mounted sections of animal tissues, it will be well to notice how much superior those of home production are to the one purchased.

Those present then spent over an hour in examining the preparations, and discussing, in a social way, the lessons they taught; and while very few present were inclined to believe in the whole Jewish faith, most were disposed to think that Moses was not far from being right when he pronounced that the swine was an unclean beast, and that the flesh thereof was unfit for man to eat, and that that law still holds good.

Dr. Cole then exhibited some fine injected specimens, viz., capsule of kidney, cerebellum, gastric follicles, kidney of cat, and jejunum.

Mr. Higginson showed specimens of fresh flowers, with star-like lime deposits.

Mr. Bœrlin showed under the binocular microscope the head of a dragon-fly.

Mr. Briggs exhibited specimens of electro-crystallized silver, gold nuggets, young oysters, and selected foraminifera.

On motion of Mr. Hankey, Mr. Briggs was requested to exhibit to the Club at its next meeting the Möeller Typen-Diatomaceen-Platte, lately imported by him from Germany, and it was made the special order of the evening.

The Club then adjourned.

MASSACHUSETTS DENTAL SOCIETY.

REPORT OF COMMITTEE ON TRIAL OF HAND AND MALLET PRESSURE.

A TRIAL of the difference of density between hand and mallet pressure came off at the house of Dr. I. J. Wetherbee, Boston, Mass., on Monday evening, November 18th, 1868.

There were present, besides Dr. I. J. Wetherbee and Dr. I. A. Salmon,

the contestants, the committee appointed, Drs. S. J. McDougall and J. T. Codman, who made a committee of three by adding Dr. Whitechurch to their number; and several other members.

An ordinary steel draw-plate had been provided. It was placed on a block of wood, the size of a man's head, weighing six pounds. One end of the plate was covered on one side with a piece of copper covering the hole to be filled, which was the centre hole at the end nearest the right hand; the large or funnel end of the hole was placed upward, and the work commenced.

Dr. Salmon, who led off, "struck the first blow" at eleven minutes to eight. He had previously provided himself with three of his automatic mallets of the latest make, and which he stated were the same as he had just used for filling a crown cavity.

The foil used was McDougall's make No. 3, and the rolls were each made of half a sheet; Dr. McDougall annealed the foil. Dr. Codman acted as secretary, while the others amused themselves in various ways, and the "rappings" were loud and "spirited" at the table where Dr. Salmon sat.

The number of blows on the first piece was not counted ; the second piece received 130 blows; the next, 180; from that number up to 275, as the circumference of the hole increased, which was the largest number counted. The cavity was filled more than full, rounded up, burnished, and filed off even with the plate ; then finished at the bottom and top, and driven out of the plate. The time taken was one hour and eight minutes.

Dr. Wetherbee then took his turn. He took off his coat and stood up to the work.

The number of thrusts or hand blows was rather more during most of the filling than the blows of the mallet, ranging from 171 to 318, as the highest number, to the half sheet, though the secretary observed that less hand blows were given than mallet blows for the final condensation. The time was a few minutes longer, being one hour and thirty-four minutes, which included some resting spells. The filling was then finished as before, driven out, and the difference of the two weighed.

The size of the hole and filling at its smallest diameter was No. 11 of the wire gauge. The amount of foil used was a trifle over $\frac{1}{8}$ oz.

The weight of the fillings finished was,—Dr. Salmon's automatic mallet, 28 grains ; Dr. Wetherbee's hand pressure, 24 grains; difference in weight, 4 grains.

The committee believe the trial to have been conducted with perfect fairness in all particulars. The blows and pressure were heavy and greater than is usually used in filling teeth, and, as the committee believe, more than is generally practicable. If any advantage existed, they think it was in favor of the mallet operator, as, the hand pressure being

exerted in a different position from usual, the instrument rested in an unusual position, and chafed the hand of the operator, making it sore even to blistering. We estimate that nearly or quite five thousand blows were given to each filling.

The time passed during the operation quite agreeably, and, at the end, those present secured the fillings for the cabinet of the Society, and they are now in the hands of the Librarian.

S. J. McDougall,
J. T. Codman,
C. Whitechurch, } *Committee.*

SUSQUEHANNA DENTAL ASSOCIATION.

BY J. M. BARRETT, WILKESBARRE, PA.

This Association met at Lewisburg, January 13th, 1869, and was called to order at ten o'clock A.M., by the President, C. S. Beck, M.D.

Sixteen dental practitioners were present. After the usual preliminary and general business was gone through with, a report was made by the delegates appointed to attend the State Dental Society, through Dr. Gerhart, and the law proposed to be submitted to the Legislature was read, when it was unanimously resolved that this Association heartily approves of the bill to Regulate the Practice of Dentistry in this Commonwealth, prepared by the State Dental Society to be presented to the State Legislature during the current session, and we most respectfully urge our respective members of the Legislature to give their influence to its passage.

Dr. Locke showed and explained an instrument of his own construction, designed to facilitate the operation of filling teeth, by having the filling partially prepared in advance, and ready to condense when introduced into the cavity. Its merits were amply discussed *pro* and *con.* by Drs. Renn, Burlan, Beck, and Gerhart; and it was finally conceded that the instrument might be made available and valuable in many cases.

Dr. Gerhart read an essay on "Plugging and Filling."

"The Fifth Pair of Nerves" being the subject in order, was taken up and discussed at length by the members generally.

Adjourned until the 14th inst.

In the evening, Dr. C. S. Beck delivered a public address on "Teeth and Health," before the Association at "University Hall" in the college buildings. It was listened to by a deeply interested and appreciative audience. He illustrated his subject with numerous anatomical preparations, and explained the functions of the teeth, etc., in a clear and lucid manner, giving evidence of deep study and a retentive memory.

The Association was called to order again at ten o'clock, Thursday,

the 14th January, by President Beck, and the subject of "Anæsthetics" taken up. This subject was ably discussed by Drs. Beck, Gerhart, Burlan, Dieffenbach, Renn, Barrett, and others.

Dr. J. L. Fordham was appointed to deliver a public lecture at the May meeting of the Association.

The essayists for the same time are Drs. C. S. Beck, Geo. B. Brown, and M. D. L. Dodson.

Subjects for discussion at next meeting, "Partial Dentures," and "The Effects of Diet on the Teeth."

On motion, the Association adjourned to meet at Jersey Shore on the 12th day of May, 1869.

HARVARD UNIVERSITY DENTAL SCHOOL.

THE dental faculty of Harvard University met on Wednesday evening, March 10, 1869, at the residence of Professor Keep, Boylston Street, in a social reunion, the occasion being the recognition of the six graduates of the newly-established dental school, and also to commemorate the first commencement. Among those present were his Honor Mayor Shurtlieff, Rev. Dr. Peabody, Professors Oliver Wendell Holmes, E. H. Clark, J. B. S. Jackson, the professors of the faculty, and most of the leading men in medicine and science. The company met at eight o'clock, and spent about three hours in a pleasant manner, refreshments being served to the guests about ten o'clock. The diplomas of the successful graduates differ from the documents usually given, inasmuch as they bear the words "Doctor Medcinæ Dentariæ," being a grade higher than the old degree, the former implying that the graduates are doctors of dental surgery; the latter, doctors of dental medicine. The class has fifteen students, six of whom graduated yesterday. It is in a flourishing condition, and opens the year under very favorable auspices.—*Boston Paper.*

EDITORIAL.

NITROUS OXIDE WATER.

IN response to a number of letters asking for information in relation to the mode of preparing nitrous oxide water, the following is presented:

The water is made by forcing the gas drawn from the gasometer into a fountain (such as is used by mineral water manufacturers) by means of an air-pump. As much as the water will take up having been forced in, the operation should be suspended, and after the lapse of a few hours it will be found that the gas has been absorbed, and more can then be forced in, and so on as long as the water will continue to take it up or until the backward pressure is as strong as the forcing power of the pump

J. H. McQ.

BIBLIOGRAPHICAL.

THE BRITISH JOURNAL OF DENTAL SCIENCE. November, 1868. London.

Through the courtesy of Dr. Wm. H. Waite, of Liverpool, we have recently received this number of the magazine, from which we take the following comments by the editor in relation to the DENTAL COSMOS for September. After referring to some of the contents, he says:

"We next find a reprint of an article written for these pages, by Dr. Evans, of Paris, and published in our issue of July, 1868, on the subject of 'Liquid Protoxide of Nitrogen.' We are no nearer the accomplishment of that fact than we were then. Certainly some was made and exhibited once by Dr. Evans, at the Dental Hospital of London, but there the matter has rested. We believe the production of the liquid protoxide is too costly to be a good commercial speculation."

As the editor of the British Journal may have inferred that the paper of Dr. Evans was taken from his journal without acknowledgment, it is due to this magazine to state that the article was printed from manuscript forwarded to us by the author, and without any knowledge of the fact that it would appear in any other journal, and it was not until some time after its publication in the DENTAL COSMOS, that we became aware of its publication in another magazine. For, although the DENTAL COSMOS is sent regularly to the British Journal, and by their acknowledgments and extracts promptly received, but for the kind attention of our friend, Dr. Waite, we should be entirely ignorant of the fact that a dental magazine is published in London. Those received, as in this instance, are five or six months after date. We regret this, as we should like to be constantly informed of the doings of the dental profession in the British metropolis, so as to communicate matters of interest to the readers of this magazine.

The Odontological Society of Great Britain are about to publish a monthly issue of their transactions, comprising the paper of the month read before the Society, with the discussion and other proceedings. This enterprise is spoken of favorably by the editor of the British Journal, and it is trusted the papers will soon find their way regularly to this side of the Atlantic. J. H. McQ.

OBITUARY.

THE DEATH OF PROF. ROBLEY DUNGLISON.

ATTENTION was directed in the pages of this magazine, about the middle of last year, to the retirement of Prof. Robley Dunglison from the Chair of Institutes of Medicine in the Jefferson Medical College, on account of failing health; and we now regret to announce the death

of that distinguished scientist, which occurred on Thursday evening, April 1st, in the 72d year of his age.

For at least half a century the deceased had been an active, laborious, and valuable contributor to medical literature. Born in Keswick, Cumberland County, England, in 1798, he entered upon the study of medicine at an early age, under Dr. Clutterbuck, a practitioner and teacher of prominence and distinction. After graduating in medicine, he entered upon practice in London, in 1819. Prior to this, however, he had commenced his contributions to literature, the first of which appeared in the Monthly Magazine, London, 1817–18. Continuing to use his pen in this way, we find him a frequent contributor to magazines, devoted to science and art, philosophy, and the practice of medicine. His activity in this direction, no doubt, secured for him his election as a professor in the University of Virginia, in 1824,—an institution established through the exertions of Thomas Jefferson, with whom and his successor, ex-President Madison, Prof. Dunglison was on intimate terms, as their friend and family physician (having closed the eyes of the former distinguished statesman and philosopher when he drew his last breath). He remained connected with this institution until 1833, when he accepted an invitation to occupy the Chair of Materia Medica and Therapeutics, in the University of Maryland, which he held until 1836, when he came to Philadelphia, in compliance with the unanimous request of the Trustees of the Jefferson Medical College, to fill the Chair of Institutes of Medicine and Medical Jurisprudence,—a position which he occupied without interruption during a period of thirty-two years, with great advantage to the institution and the profession at large. His advent may be justly said to have exercised a salutary influence, not only upon the institution, but also upon the medical fraternity of our city, which was somewhat divided with respect to the merits of the two schools. Ten years before (April 7, 1826), through the exertions of Dr. Geo. B. McClellan, the Jefferson Medical College had been founded and chartered by the Legislature of Pennsylvania. To the establishment of this institution there was very great opposition on the part of a number of the medical fraternity, and the feeling existing between the friends and opponents of the institution was not entirely free from acrimony for years. In addition to this, incongruous elements were brought together in the formation of the faculty; and, as a consequence, resignations were frequent, and the ultimate success of the institution placed in jeopardy. On connecting himself with the institution, Prof. Dunglison set himself to work to heal internal dissensions, and overcome external opposition: in this effort he was markedly successful. In illustration of the feeling existing at that period and his own efforts to establish amicable relations, the deceased informed the writer, on one occasion, that the first time he met Prof.

O. W. Holmes was at a social gathering at the house of his colleague, Prof. Mütter. As he approached the distinguished guest, he was saluted by the eccentric Dr. Paul B. Goddard, with—"*Here comes the peacemaker.*"

The acerbity of feeling engendered when what are erroneously regarded as rival interests are at stake, and which is fostered and kept alive only through the exertions of persons who are constantly misapprehending or misrepresenting matters, quickly disappeared under the benign influence of Prof. Dunglison and his able colleagues, and he enjoyed the pleasure for many long years of seeing pleasant professional and social relations existing between the members of the faculties of the two great medical schools of our country, and of contributing largely through his great abilities and urbanity to the success of the institution with which he was connected. The estimate in which his talents and social qualities is held by his late colleagues is embodied in the following resolutions:

JEFFERSON MEDICAL COLLEGE,
PHILADELPHIA, April 2, 1869.

WHEREAS, It has pleased Almighty God to remove from among us, in the evening of his life, and in the fruition of a world-wide reputation, our friend and late associate, DR. ROBLEY DUNGLISON, Emeritus Professor of the Institutes of Medicine in the Jefferson Medical College, and late Dean of this Faculty;

AND WHEREAS, He was warmly endeared to us by his high social qualities, his stern integrity of character, his unceasing devotion to his official duties, his uniform urbanity and kindness, and the great purity of his life;

AND WHEREAS, In his death the medical profession has lost one of its most learned, zealous, and exemplary members, medical literature one of its most able promoters, medical science one of its most successful cultivators, and medical philosophy one of its most faithful interpreters; therefore

Resolved, That this Faculty will attend the funeral of their late friend and colleague in a body, and that one of their number be appointed to deliver, at the opening of the next session of the College, a discourse upon his life and character.

Resolved, That a copy of these proceedings, authenticated by the signature of the Dean, be transmitted to the family of the deceased, with the expression of our heartfelt sympathy in their bereavement; and that the same be published in the different papers, and in the two medical journals of this city.

SAMUEL HENRY DICKSON, M.D.,
Dean of the Faculty.

As a teacher, Prof. Dunglison was eminently popular with the students. His vast erudition, fluency of speech, apt illustrations, and the clearness of his descriptions, threw an attraction and interest around his lectures which always drew to his room a large and attentive class. At the period when the writer of this was in attendance upon medical lectures, some twenty years ago, he never saw any manifestation of listless-

ness or inattention by the class, but, on the contrary, the most marked attention and respect. In presenting his own views, or the conflicting views of eminent writers and observers, there was entire freedom on his part from anything like dogmatism. In place of advocating any particular theory, in the spirit of a lawyer defending the cause of a client, who gives undue prominence to everything that would be of advantage to his side, and suppresses everything that would be to his disadvantage, Prof. Dunglison rather maintained the position of the impartial judge, who, in presenting the views of learned counsel on each side to an intelligent and educated jury, leaves them to decide for themselves, without bias on his part, that which appears most in accordance with reason. A course such as this, on the part of a teacher, deserves the highest commendation, as it is the one best calculated to make independent observers and thinkers of his auditors.

As a writer, his voluminous contributions to medical literature will secure for Prof. Dunglison an enduring fame. To merely enumerate a list of the titles of these would require more space than could be conveniently accorded to them in this magazine. The most prominent, and those likely to be most enduring, are his Medical Dictionary, Human Physiology, and Hygiene. Possessing all the learning, and taking the same interest in philology as Dr. Samuel Johnson, Prof. Dunglison was pre-eminently fitted for the duties of a Medical Lexicographer, and his excellent dictionary can be found not only in the library of every medical practitioner of the country, but in addition his definitions are quoted as authority by Worcester, Webster, and other lexicographers; it has also afforded the material of which other aspirants to the honor of preparing dictionaries have made free use; and sometimes with exceedingly limited acknowledgments to the source from which this material was obtained. Embracing as his Human Physiology does a general summary of the various theories that have been advanced from time immemorial in relation to the anatomy and functions of the various organs of the human economy, an invaluable fund of knowledge is here presented to the student, wherein the opportunity is not only afforded for securing an admirable condensation of knowledge scattered through an immense number of works, but in addition, by means of the authorities referred to, the most extended investigation of the literature of the subjects presented can be made by those who may desire to do so. In this connection it may be said that Prof. Dunglison is rather to be regarded in the light of a generalizer of facts than as an original investigator, for he possessed that cast of mind which philosophically digests and arranges in an orderly and methodical manner the investigations of others. Never having taken an active part in the general practice of medicine, his inclinations, tastes, and position constituted him mainly a teacher and a writer. Surrounded by his books, the greater part of his waking hours were passed

in his library in the preparation of new works or the revision of his old ones. Some idea of the esteem in which his works are held by the medical profession may be inferred from the fact that one hundred and fifty thousand volumes of them have been sold by his publishers.

A gentleman of simple tastes, unostentatious and genial manners, he was easy of access, and ever ready to impart knowledge to those who desired it, with a liberality characteristic of a true man of science. Possessing a valuable library, containing choice works of science, many of which cannot be found in public libraries—at least in this country—they were freely accessible to those whom he felt sure would not abuse his confidence by mutilating or losing them. In this respect the writer is under innumerable obligations for acts of kindness and valuable information received in an intercourse of many long years.

As a philanthropist, he took a deep interest in those unfortunates—the blind; and as Vice-President of the Blind Asylum of Philadelphia and Chairman of the Committee on Instruction, contributed largely to the usefulness of that institution; preparing, among other acts, a dictionary of raised letters for the blind, the first and only work of the kind ever attempted.

Although diseased in body, his mind remained unimpaired to the latest moment: dying in the full fruition of his mental powers, he leaves behind him an enviable reputation, and the respect and love of thousands of medical graduates who sat under his tuition, many of whom are not only engaged in the responsible duties of practice, but also in teaching the various departments of the science of medicine.

J. H. McQ.

At an adjourned meeting, held at Dr. Wright's office, March 1st, 1869, by the members of the dental profession of the city of Columbus, Ohio, called for the purpose of considering and passing some befitting resolutions expressive of our bereavement in the death of a professional brother, Dr. John Fowler, whose deportment in life as a citizen and professional brother has endeared him to all our hearts, on motion of Dr. Dunn, the following resolutions were unanimously adopted:

Whereas, In the infinite wisdom of Almighty God, He has seen fit to take from us our beloved friend and brother, Dr. John Fowler;

Whereas, By his honesty of purpose, by his integrity of character, and by the exercise of the most exalted social, moral, and professional qualities, he has left an example most worthy of our imitation, it is therefore, by this meeting,

Resolved, That in this dispensation, the dental profession has sustained a loss which will be felt and deeply mourned by each and all its members.

Resolved, That we cordially tender to the family of the deceased our deepest sympathy and condolence, and our prayers that they may be sustained and comforted by Him who, for his own wise purpose, has called our brother hence.

Resolved, That a copy of these resolutions be sent for publication in the different dental journals, and to each of the daily papers of our city, and that a copy of the same be transmitted to the family of our deceased brother.

H. TODD,
E. M. WRIGHT,
G. W. DUNN,
ALLEN F. EMMINGER,
W. W. RILEY,
J. B. BEAUMAN,
R. G. WARNER,
A. SPENCER,
D. MCBRIAR.

CORRESPONDENCE.

MENDING PLASTER MODELS.

BALTIMORE, April 5, 1869.

Editor of the Dental Cosmos:

WE often, through carelessness and accidents, break teeth and parts from plaster models. If you know of a cement for repairing the broken cast, you would oblige the undersigned, and perhaps many more, by inserting a recipe for such a cement in the DENTAL COSMOS.

A SUBSCRIBER.

If the cast is not thoroughly dry, wax or a mixture of wax and resin is useful to repair with. If the cast is perfectly dry, melted shellac or shellac varnish, two or three coats applied to each of the broken surfaces, makes a strong joint.

IODINE AND ACONITE IN PERIODONTITIS.

"The following paragraph is from among the 'notes and queries' of the *London Medical Times and Gazette* for February 20, 1869. The extract referred to as in our issue of January 7, is credited to the DENTAL COSMOS. Will that journal furnish the information desired? We suppose the querist may wish to know how many drops of the mixture are to be applied at each session:—

"'Professor Abbott writes:—The best remedy, and the one that works the most conveniently for Periodontitis, I have ever used, is a mixture of equal parts of officinal tincture of iodine and tincture of aconite root applied to the gum around the roots of the tooth with a camel's-hair brush, or a portion of cotton-wool at the end of a stick. I have been using it for a year, and have not found it fail. I apply it, in the early stages of the inflammation, once in the twenty-four hours, and in very severe cases twice.—*Boston Journal*, January 7.—(*Query:* What dose of aconite is administered?)'"

In response to the preceding paragraph from the editor of the *Boston Journal*, the following answer is presented:—

NEW YORK, April 12, 1869.

MY DEAR DOCTOR: Yours of the 9th has just reached me.

Answer.—In each application there is used from two to three drops of the mixture, making from a drop to a drop and a half of aconite.

I am much more favorably impressed with this mixture now, than

when I wrote you in relation to it. It is really wonderful how quick it will check very severe cases of periodontitis. I will mention one case, simply to give you something of an idea of its effects.

A short time since a patient presented himself at my office, with a tooth I had filled a few days before paining him very much,—so much, indeed, that he had not slept any for two nights. I made an application of the mixture, and asked him to call the next morning, which he did. I found the case slightly improved, and made another application, and asked him to call that evening. He did so, and there was considerable improvement; but, wishing to effect a cure as early as possible, I made a third application, and instructed him to come in the next day, if the tooth did not feel materially better. I have seen him several times since. His mouth is perfectly comfortable. I should have stated that the pulp of the tooth in question had been dead several years. The canal had been cleaned and filled.

The foregoing is one of *hundreds* of cases treated with this mixture, and *all* with the same good result.

This is not the only use the mixture can be put to to advantage. It is excellent in almost any case of inflammation. Prof. Weisse, of our college, has been using it recently, very *successfully*, in cases of very severe inflammation of the tonsils.

One precaution should be taken in its use; that is, the fluids of the mouth should be kept from it until the alcohol is sufficiently evaporated to prevent its being washed from the parts where it is applied, which is about one minute.

If you have not tried it, I wish you would do so and let me hear with what result.

Respectfully yours,

FRANK ABBOTT.

SELECTIONS.

LORD BROUGHAM'S DENTIST.

"IN the Court of Exchequer, on Tuesday, the case of Lows *v.* Lord Brougham was heard. This was an action for the amount of a dentist's bill. The defendant paid £82 into Court, which he said was sufficient to satisfy the plaintiff's claim. Mr. Millward, Q.C., Mr. Charles Russell, and Mr. Kirby appeared for the plaintiff; Mr. D. Keane, Q.C., and Mr. R. E. Russell for the defendant.

" The plaintiff, Andrew Lows, was a dentist at Carlisle and Penrith, and he brought this action against the defendant, as executor of the late Lord Brougham, to recover the amount of the following bill, which was sent to his lordship on the 22d of November, 1862: '21 visits and consultations at Carlisle, Brougham Hall, and London; repairing sets of upper and under teeth; two upper and lower sets of artificial teeth, gold springs and swivels; brushes, powder, etc.—£157 10s.'

" It appeared that the late Lord Brougham sought the services of the plaintiff in the autumn of 1862, and that during a period of four or five months he was frequently attended by the plaintiff and his assistant.

When the account was sent in his lordship made some objection to it, and it remained unpaid until his death, when, on application being made for the money, the defendant refused to pay, on the ground that the charges were exorbitant. The plaintiff charged 40 guineas for each of the two sets of teeth, and 2 guineas for each of the attendances, amounts which were said to be moderate under the 'embarrassing circumstances.' The assistant said his lordship's mouth was very sensitive, and that he was very impatient and petulant under the operation of the dentist, and the plaintiff mentioned that he sometimes conversed a good deal at the consultations, and would occasionally give an account of his early life.

"In cross-examination he denied that the man whom he sent to Grafton Street, London, with a bill in November, 1862, told him that Lord Brougham had expressed his astonishment, and said he had no doubt he (the plaintiff) had come to town to swindle him on hearing of his going away to Cannes.

"Several witnesses were called to prove that the charges were fair and proper.

"Mr. Keane, on the part of the defense, said that his client felt bound, in justice to the memory of the deceased, as well as for the protection of the interests of his representatives, to resist the claim, which he believed extravagant and extortionate. In December, 1862, Mr. William Brougham wrote to the plaintiff for particulars of his claim, but received no reply, and in spite of repeated applications to the same effect the particulars were not sent until a few months before Lord Brougham's death, which occurred in 1868. In consequence of the dispute, some one was sent, in December, 1862, to the plaintiff's place at Carlisle, to ascertain his prices, and was informed that the cost of a complete set of teeth of the best kind was 25 guineas. This clearly proved, contended the learned counsel, that the plaintiff had grossly augmented his claim, and that the amount paid into court was amply sufficient.

"James Garbett, the personal attendant on Lord Brougham for 28 years, was called to contradict the plaintiff with respect to some of the alleged interviews, and he said his lordship was so impatient that he would never allow a dentist to remain long enough with him to do his work. When the bill was brought to him in December, 1862, he was very indignant, and sent off the plaintiff's man very quickly.

"A carver, named Joseph Scott, proved what the plaintiff's prices were in 1862.

"The following characteristic letter from Lord Brougham to his brother was read:

"'GRAFTON STREET, Nov. 23, 1862.

"'Here is the unintelligible bill of Lows'. He sent his man for a check, and I blew him up, refusing absolutely, and telling him I was utterly astonished by the charge, and should leave it to you to settle. It is beyond all endurance, and I am prepared to defend an action if he dares to bring one. I have no doubt that he came to town on purpose to swindle me in the hurry of my getting away. . . . All are well, but I am much disturbed by that villain, Lows. If he calls I shall not see him.'

"Mr. Hepburn and Mr. Cartwright, the eminent dentists, gave evidence as to their charges, which were much below those made by the plaintiff.

"After a prolonged absence, the jury returned into court with a verdict for the plaintiff—damages, £22 10s. beyond the amount paid into court."—*English Paper.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Cleft of the Hard Palate.—Dr. William R. Whitehead read before the N. Y. Medical Journal Association, on the 19th of February, an interesting paper on the surgical treatment of this abnormity, of which the following abstract is given in *The Med. Gazette:* "Cleft of the hard palate has been regarded by most surgeons as beyond the resources of surgical intervention; and though numerous attempts have been made to establish the operation for this infirmity as a feasible and desirable procedure, yet not until within a few years has this much desired object been attained.

"In 1816, Græfe, of Berlin, was the first to attempt the operation for cleft of the soft palate, but was unsuccessful, and three years later Roux gave a brilliant *éclat* to the operation known as staphylorraphy, by the happy success which attended his essay on the person of Dr. Stephenson, who read the report of his own case before the French Academy of Medicine. Staphylorraphy then came in vogue with aspiring surgeons; its difficulties were more or less successfully met by ingeniously-devised instruments. It had its glories and its defeats, the former being due to the more or less propitious circumstances which attended and succeeded its exact and skillful performance. * * * * * *

"The operations for cleft of the hard palate shared a worse fate; and though Roux, Kreimer, J. Mason Warren, Pollock, and some others, met with a certain encouragement, yet the opinions of most medical men regarding operations for the closure of congenital or acquired defects of the hard palate have been strongly marked with dissent; and at the present time the mechanical devices of the dentist are preferred to all operations for cleft palate of every description, by those who are unacquainted with the progress which has been made in this part of surgery.

* * * * * * * *

"Gentlemen, I ask your indulgent attention to what I have to say about a German operation, and I believe I am the first who has endeavored to introduce it in this country. Many of you, I have no doubt, are familiar with Pollock's successful cases of cleft of the hard palate, and possibly some of you are acquainted with the attempts of Baizeau at restoration of acquired defects of the palatine vault. I shall not detain you with a consideration of the old modes of operating for cleft of the hard palate. It affords me pleasure, however, to remind you that to our honored and lamented countryman, J. Mason Warren, whose signal services in American surgery are respected at home, and widely esteemed abroad, is due one of the most remarkable and singularly successful efforts at closure of an extensive cleft of the hard palate. The direction and extent of the incisions in this case, as subsequently were those used by Pollock, resembled very much those adopted in the German method. But what particularly distinguishes this method is the inclusion of the periosteum within the flaps, with a view to the reproduction of bone. As you are well aware, the subject of the reproduction of bone from the periosteum has been well studied practically in our own city. The comparatively recent publication of the extensive works of Ollier and

Sédillot have added fresh and much-increased interest to this suggestive subject. The experiments of Flourens on the periosteum of animals were not lost to science, and some desirable applications to surgery have attested the value of those experiments. To Langenbeck we are indebted for an eminently useful application of the principles which Flourens had enunciated; to the Prussian surgeon is due a very successful operation which, while it includes the periosteum in the flaps, with a view to the ultimate reproduction of bone to close the fissured vault, preserves the nutrient vessels uninjured, and thus contributes to success, by the avoidance of gangrene and sloughing of the flaps.

"After dwelling upon the importance of an entire eradication of the constitutional disease which sometimes causes the defect, before attempting an operation, the lecturer continued:

"I think that there can be fairly claimed for this procedure advantages which entitle it to a prominent place in the list of useful operations. While I am quite sensible to the objections, some of which may with reason be urged against it, yet the undeniable advantages in its favor may justly claim your attention. In giving a brief history of the case which I offer for your inspection this evening, I shall endeavor to embody in it the most important points necessary to a comprehension of this operation, designated by the somewhat dissonant term, muco-periosteal uranoplasty. But previously, I request your attention to the peculiar distribution of the arteries which supply the roof of the mouth. The descending or superior palatine artery, as you know, before emerging from the palatine canal, gives off a few small branches, which pass down the small accessory palatine canals, and are distributed to the muscles of the soft palate and mucous membrane. The superior palatine, in its horizontal portion, runs along in a groove at the junction of the horizontal plates of the maxilla and palate-bones with the alveolar process. Anteriorly this artery passes through the anterior palatine canal upward to anastomose with the one on the opposite side and the artery of the septum nasi. The horizontal portion of the superior palatine is of considerable size, and is included in the periosteal flaps when they are detached from the bone. But these flaps remain adherent at their three nutrient points, which correspond to the orifices of the spheno-palatine canals and the anterior palatine canal. The superior palatine is of considerable size, and if cut may occasion troublesome hemorrhage. But this accident can be readily avoided by carefully detaching the periosteum with a blunt periosteal elevator. There is a little branch of the ascending palatine which, after passing between the tendons of the levatores and tensores palati muscles, is in relation with the inner border and posterior surface of the tensor palati muscle, and the knife in dividing this muscle during the operation to relax the velum palati, cuts this little branch, and nearly always causes some bleeding, which, however, can be conveniently checked with ice-water spray thrown on the part.

"There are numerous differences in the form, extent, and general appearance of cleft palates. They are very naturally divided into those which are congenital, and those which are the consequences of disease, as syphilis or scrofula, or of accident, the result of gunshot wounds of the mouth. After operations on the palatine vault, as in the removal of tumors of this region, or after resection of the upper jaw, the surgeon may be called upon to close by operation defects of the hard palate.

The congenital defects are more or less familiar to you all. Most usually, the cleft does not extend beyond the middle of the horizontal plates of the maxillæ. Very often the fissure is complete, and there is separation of the alveolar process in front; sometimes with a disfiguring projection of the intermaxillary bones. Occasionally there is a double cleft of the hard palate, complicated or not, with double or single hare-lip. Exceptionally, there is seen a congenital defect of the hard palate only, and the soft palate is not split. Usually, however, whenever there is cleft of the former, there is complete separation of the velum. The cleft is quite often median—that is, occupying the middle of the vault; but very frequently, it is more to the left. There are infinite varieties and degrees of this infirmity; but the operation, as applied to one of the not infrequent forms of cleft of the hard palate, and such as that to which I now ask your attention, will suffice to illustrate the main features of the operation. But on account of the very incomplete development of the lateral halves of the cleft velum in this case, the improvement in speech will necessarily be less marked than it would be were that development more considerable.

"Case.—Maria D., aged 7, had a complete cleft of both the hard and soft palate, which originally extended through the alveolar process in front, and was complicated with hare-lip, which last had been operated before I saw her, leaving an ugly-looking notch, which, however, can be readily closed. The cleft was five-eighths of an inch posteriorly, and gradually diminished toward the front at the alveolar process. The deformity, as it appeared before the operation, is well exhibited by a plaster cast of the roof of the mouth, taken by a dentist previous to the operation.

"On December 16th, 1868, the whole of the cleft was closed by suture as follows:

"After the administration of ether, the palato-pharyngeus, palato-glossus, and levator-palati muscles were severed, and the operation continued; but not until after the loss of considerable time by the vomiting of the patient. There was also some delay occasioned in arresting the bleeding, and in washing out the throat with a spray apparatus. The point of a sharp knife, curved on its surface, was passed around and behind the hamular process, and over the lower part of the internal pterygoid plate, so as to cut loose the mucous membrane which confined each lateral half of the velum to this part.

"If there had been a very perceptible ledge of bone, formed by the horizontal process of the palate-bone, it would have been necessary, as Langenbeck recommends, to detach the mucous membrane from the posterior border of this vestige of the palate-bone; and this is a very important precaution, as otherwise the flaps will not fall together as they should do after other stages of the operation are completed. This was the most difficult and tedious part of the operation, and is generally so considered. An incision was next made along the edges of the cleft. It is proper here to remark that, if there be a ledge of bone, this incision should run along its edge, being careful, in every case, to keep at least an eighth of an inch beyond the groove in which courses the superior palatine artery. This incision should be made to the bone, and run along on its surface. Other cuts were next made, one on each side, which extended from the eye teeth to slightly beyond the last molars, and along the border of the gum. These cuts were made through the

periosteum and to the bone. Such extensive cuts may not always be necessary, and *interrupted side-cuts* have sometimes been preferred.

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"In detaching the periosteum, the nutrient parts of the flaps, to which I have alluded, were carefully respected; and after this stage of the operation was completed, the flaps almost met in the middle line. The paring of the edges was next done, and the passage of the sutures, seven or eight in number, readily followed by means of a suture-needle, which I now exhibit, and which I claim to be better than that used by Langenbeck or others in this operation.

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"Bits of cotton were stuffed in the side-cuts, to keep them from healing too soon, as also by the pressure which they exerted on the sides of the flaps, to extend the line of union.

"The hemorrhage was quite abundant for a few minutes, but was readily controlled by means of ice-water spray. This bleeding came from the little branch of the ascending palatine artery, where I divided the levator-palati muscle. The bleeding which occurred in detaching the periosteum was very inconsiderable, as this membrane was torn off with the blunt edge of an elevator. In this respect the detaching of the periosteum in this manner guards against the hemorrhage such as was formerly the accompaniment of mucous uranoplasty; in which, on one occasion and my first uranoplastic operation, I cut the superior palatine artery; but controlled the hemorrhage, without much trouble, by compression and the use of styptics.

"Langenbeck states that 'in 14 cases in which mucous uranoplasty was done, there were six cases of dangerous secondary hemorrhage; whereas in 25 cases in which the periosteum was detached, there was no after-bleeding.'

"The patient was put to bed, and some strong beef-tea and other liquid food, as milk, ordered, as her only nourishment for ten days. There was no sloughing or profuse suppuration following this operation. Spray, containing carbolic acid, was thrown into the side-cuts, into the throat, and through each nostril into the nose; great care was taken not to project the spray on the line of union. The cotton plugs were removed several times, and fresh ones saturated with glycerin put in their places. In the left side-cut some of the cotton remained much longer than I intended, and was not discovered until all the sutures were removed, most of which were taken out about the 14th day, and the last ones were removed on the 18th. The union was found complete all the way through; and the parts at present feel as if solid bone will ultimately be formed. This point, however, I prefer to test a little later with a needle.

"Of 55 cases collated by Dr. Whitehead, 47 were congenital, and 8 acquired deficiencies of the hard palate. Most of these operations were performed by Langenbeck and Simon. Of the 47 congenital cases, 35 showed a complete cleft of both hard and soft palate. In 3 of these there was double hare-lip—in 2 a single hare-lip—and in 5 a double cleft of the vault, complicated in one instance with double hare-lip. There were 10 cases in which there was an incomplete cleft of the hard, and a complete cleft of the soft palate. In one case there was no mention made of the defect, and the remaining case was one of partial cleft of the hard palate without separation of the soft palate. In 13 of the 47 cases, staphylor-

raphy preceded uranoplasty. In 5, uranoplasty was done first, and in 24 cases uranoplasty and staphylorraphy were performed at one operation. In 5 cases uranoplasty alone was done. Silver sutures were used in only a few of the cases.

"In 33 cases the cure was complete; in 9 incomplete; and 5 were failures, one resulting in the only death on record, which occurred in a child two years old, operated on by Simon, from septicæmia on the 10th day. Out of 5 cases operated on by Beck, speech was improved in 4; the remaining one was incomplete; and in 2 the nasal tone persisted. Of 3 operations performed on children by Billroth, 2 were failures. Of 21 operations by Langenbeck, one failed, and in 4 the cure was incomplete; in 11 there was more or less marked improvement in speech. Sédillot reports a single case, but says nothing about the speech. Out of 15 cases reported by Simon, in 4 speech was nasal and hard to understand; in 6 it was rendered intelligible but remained nasal; in 2 uranoplasty alone was performed, and speech was not improved; and in 3 either the hard or soft palate reopened or failed to unite. In a case reported by Dr. Whitehead, the speech has become distinct and intelligible, but the nasal tone still persists.

"With regard to acquired defects of the hard palate, resulting from disease or wounds, nearly all the operations cited were attended with immediate restoration of normal speech. The persistence of the nasal tone, to which Simon has pointedly called attention, would seem somewhat to impair the usefulness of the operation when applied to cleft of the hard palate, involving a separation of the velum. There can be no doubt, that when the cleft is very considerable, and the two halves of the bifid velum are exceedingly small and undeveloped, there is not enough tissue out of which to construct a movable and serviceable soft palate, which shall even moderately well supply the offices of a normally-developed velum.

"Whenever cleft of the hard palate is accompanied with a wide separation of the velum, and when this last is not much developed, distinctness of speech may be obtained by the combined operations of uranoplasty and staphylorraphy, but the nasal tone will always persist, because the newly-formed palate will be too short, and the united velum too tense to permit at will the occlusion of the nasal from the buccal cavities.

"The operation of periosteal uranoplasty, although tedious, is attended with very little danger to the patient. The flowing downward into the throat and stomach of the nasal secretions is prevented afterward; and this is no inconsiderable advantage to those who are afflicted with such a repulsive infirmity as an extensive cleft of the hard palate. An obturator, with a soft-rubber velum properly adjusted to it, may admit of temporary advantages, but like some other mechanisms, it is only a make-shift, and is liable to become disarranged. It needs repairs, and requires frequent cleansing.

"Obturators, in order to fit accurately, must be adjusted to the increasing size of each young patient's mouth, and every six months a new obturator may be needed. They are often sources of irritation; they wear the teeth to which they are sometimes attached, and frequently oppose the spontaneous closure or lessening of small perforations of the palate. These devices may be swallowed; in fact, in one instance, death was the consequence of asphyxia from this cause. They are, in some

respects, much like some of the artificial limbs which promise much and are at first very attractive, both to the patient and to the surgeon; but these artistic legs are after a while thrown aside to give place to crutches, or are worn only on grand occasions, being designed more for show than for use.

"Obturators, however, have their uses, and may sometimes advantageously replace the operation of muco-periosteal uranoplasty."

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"*Hypertrophy of Gums; Partial Resection of Superior Maxilla.* By Thomas Waterman, M.D.—M. A. S., a young woman of average mental capacity, æt. 27. She has never been in good health. Her mother and her nurse say that the disease of which she is the subject is not congenital, but ever since the patient herself can remember she has been asked, 'What is the matter with your gums?' She has repeatedly had abscesses about the mouth, gum-boils, catarrh, and suffered most of her life from thick speech, deafness, difficult deglutition, and dull pain in the jaws.

"On examination the gums are seen to be hypertrophied along each side of the dental arches—not uniformly, but more prominently at some points than at others. The principal outgrowths are in front of the canine and incisor teeth in the upper jaw; in the lower jaw they occupy the place of the molar teeth on both sides. In the palatine arch of the superior maxillary bones two projecting excrescences, having their attachment anteriorly, pass backward, concealing the soft palate: in the cleft between them the uvula can be seen. On passing the finger into this cleft it can be swept around slightly, the soft palate and a small part of the hard palate not being connected with the growth. These excrescences feel quite hard and non-elastic. The portions which project backward are somewhat movable, and can be pressed up so as to touch the palate.

"At various times several teeth have been extracted, and the patient thinks that this has caused the growth to shrink somewhat, but the changes have been slight during the last eight years.

"On the 26th of June all the teeth of the upper jaw were extracted, and at the same time those portions of the excrescences of the upper jaw which concealed the soft palate were sliced off. The patient was discharged on the 3d of July, and re-entered the Mass. Hospital October 7th. The disease in the mean time had remained quiescent.

"October 9th the whole of the outgrowths were removed with the gouge, and the dental border of the superior maxilla sawed off. The wounds healed rapidly, and on the 21st of October the patient was discharged, with the cut surfaces granulating in a healthy manner.

"The rarity of the disease has led me to report this case, the interest of which centres in the peculiarity and infrequency of such an hypertrophy, rather than in the result of the operation.

"I find but three recorded cases of this disease, one by Prof. Gross,* one by Mr. Pollock,† and a third by Mr. Heath,‡ occurring under the care of Mr. Erichsen, in Univ. Coll. Hosp. In the first two cases the disease was congenital, and returned to some extent after removal. A

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* Gross' System of Surgery, 2d edition, vol. ii. p. 534, fig. 330.

† Holmes' System of Surgery, vol. iv. p. 18.

‡ Injuries and Diseases of the Jaws, London, 1868, p. 189.

very remarkable specimen of this disease presented itself in the person of a female of feeble intellect, covered with a remarkable hairy growth, who was exhibited by a showman in this city some ten years ago under the name of 'Bear Woman.' The hypertrophy of the gums was even more conspicuous than in the recorded cases. It is a little singular that Mr. Pollock's case was characterized by an extraordinary pilous development, and the patient a subject of epilepsy. Dr. Gross' patient was a stunted and feeble-minded boy.

"Under the microscope the disease presented a purely fibrous growth, without myeloid cells, distinguishing it from epulis, with which, however, it was little likely to be confounded, neither the general aspect nor the mode of its growth bearing resemblance to the distinct masses and interdental origin of that affection.

"The gross appearances of hypertrophied gums resemble the disease called lampas, occurring in the horse. The latter, however, is an *inflammation* of the gums, propagated to the bars of the roof of the mouth, and rising to a level with and even beyond the teeth. It usually subsides without treatment, or only requires slight scarifications."—(*Boston Med. and Surg. Jour.*)

"*Cystic Tumor of the Maxilla.*—A girl, aged eighteen, was admitted into the Middlesex Hospital, under the care of Mr. Hulke, on October 20, 1868, with a tumor of the face of three years' duration. Mr. Norton, house-surgeon, gives us a description of it. It was attached by a broad base to the outer surface of the maxilla, above the alveolar process, and it distended the cheek. On firm pressure, a peculiar recoil was perceptible, giving the impression of a bony cyst; and the escape of a few drops of viscid fluid through an exploratory puncture with a grooved needle confirmed this opinion. The alveolar process, the palate, and the nasal wall of the antrum were not distended. A free opening was made by cutting away part of the thin outer bony wall, which exposed a cavity lined by a smooth membrane projecting into the antrum, as well as outwardly. It held about six drachms of viscid mucus. No solid contents were found. Suppuration followed. The cavity was daily syringed with a solution of permanganate of potash, and it slowly contracted, the disfigurement being completely relieved."—(*Lancet.*)

"*Acute Rachitis.*—In the *Jahrb. f. Kinderheilk.*, 1868, Dr. Forster describes a case of what he terms acute rickets. It occurred in a child, one year old, of whom the femoral bones of both inferior extremities, in their entire length, commenced to become painful, and to enlarge in diameter with considerable rapidity. In all other respects the morbid phenomena presented by the case were precisely the same as those described by Bohn as pathognomonic of acute rachitis, including even the peculiar affection of the gums. The etiological relations and course of the disease were also those laid down by him."—(*Centralblatt f. d. Med. Wissenchaften*, D. F. C , and *Am. Jour. Med. Sci.*)

"*Trismus caused by a Carious Tooth. Case.* By A. Reeves Jackson, M.D., of Stroudsburg, Pa.—Maria L., aged 28 years, called upon me, in company with her husband, and gave the following history:

"Five weeks ago she commenced suffering pain, which she referred

to the wisdom tooth, in the left side of the lower jaw. The same tooth had frequently been the seat of pain during the past five years. The pain decreased in severity after the first few days; but she noticed a difficulty in opening the jaws, which gradually increased, and at the end of three weeks she could not separate them at all. When she made a strong effort to open her mouth, the attempt, if in any degree successful, was followed by a sudden snapping of the teeth together. Occasionally these spasmodic actions were observed without any attempt having been made to open the mouth; but they were infrequent, and of short duration. The general health of the patient was good.

"On examination, I found the trismus complete, and any attempt to separate the jaws was followed by sudden spasm and pain. Inserting a finger between the cheek and the gum, I observed that the least pressure over the diseased tooth produced pain, although it did not excite any spasm. A painful spot was detected also just in front of the left ear, at which point there was some swelling.

"I administered, by inhalation, a mixture of ether and chloroform until sufficient relaxation of the muscles was produced to permit the extraction of the tooth, which was accomplished with some difficulty. A few spasmodic movements of the jaws were observed during the next two days; but they diminished in frequency and violence, and soon disappeared entirely."—(*Am. Jour. Med. Sci.*)

Dentition in Chronic Diarrhœa.—"Although the nutrition of the body is so much interfered with in this disease, and the child daily emaciates more and more, yet it is exceedingly curious to find how in certain cases—usually the less severe ones—the growth and development of the teeth may continue in spite of the general condition. In the cases in which this occurs the teeth are for the most part cut easily, and without any apparent aggravation of the other symptoms. Nor does the eruption of each tooth appear to be accompanied by any special improvement which can be attributed to that as its cause. Dentition goes on rapidly and easily, while the diarrhœa remains stationary, or slowly improves. These cases generally recover. In an infant of eight months old whom I attended for this complaint, five incisor teeth made their appearance in the course of a month. The child got well. From this consideration we may conclude that the common idea which associates this disease with dentition, as a result of the cutting of the teeth, is one entirely without foundation. Dr. Cheyne, who first described this disorder, under the name of atrophia lactantium, or the weaning brash, also takes this view. He states that this disease is often seen in cases where there is no swelling or inflammation of the gums, no salivation or any appearance of pain or tenderness about the mouth, in cases where the child is cutting his teeth easily, and even in children of three months old, who have no teeth at all. We shall see that it may begin almost at birth. * * * * * * *

"Many children are said always to cut their teeth with diarrhœa. Perhaps, however, dentition in these cases is not so entirely to blame as is commonly supposed. No doubt, during the cutting of the teeth, the bowels generally are in a state of irritability, for we know that at these periods the follicular apparatus of the intestines is undergoing considerable development. The bowels then are ripe for diarrhœa, there is increased sensitiveness to the ordinary exciting causes of purging,

but without the presence of these exciting causes diarrhœa is by no means a necessary result of such a condition of the alimentary canal. We find that looseness of the bowels is a more common accompaniment of dentition in summer and autumn than in winter; that is, at a season when the changes of temperature are so rapid and unexpected, and when therefore the child is particularly exposed to sudden chills, rather than at a time of the year when the temperature, though lower, is more uniformly low, and when precautions are more naturally taken against the cold. Dentition, too, commences at a period when the child is beginning to require additional food besides that furnished by his mother's milk, and consequently at a time when he is so liable to be supplied with articles of diet unsuited to his age. Even if the diet be a suitable one for the infant when in health, it by no means follows that the same regimen will be found equally appropriate at a time when the febrile irritation set up by the advancing tooth has temporarily reduced his digestive power. His ordinary diet may then become indigestible, and therefore irritating to his bowels."—(Dr. E. Smith, *Med. News.*)

" *Temperatures in Healthy Children.*—Mr. Finlayson exhibited to the Manchester Medical Society an elaborate series of tables of Temperatures in Healthy Children.

" They comprised two hundred and eighty-one observations on eighteen different children, of ages varying from twenty months to ten and a half years; and he summarized his conclusions as follows: 1. The daily range of temperature is greater in the healthy child than that recorded in healthy adults. The author's observations gave a mean of 2° F.; those of Davy, Gierse, and Frölich, on themselves, about 1° F. 2 There is, invariably, a fall of temperature in the evening, amounting to one, two, or three degrees. 3. This fall may take place before sleep begins. 4. The greatest fall is usually between 7 and 9 o'clock (at least, under the conditions of life usually observed in hospitals). 5. The minimum temperature is usually observed at or before 2 A.M. 6. Between 2 and 4 A.M., the temperature usually begins to rise, such rise being independent of food being taken. 7. The fluctuations between breakfast and tea-time are usually trifling in amount. 8. There seems to be no very definite relationship between the frequency of the pulse and respirations and the amount of temperature, the former being subject to many disturbing influences."—(*British Medical Journal* and *Amer. Jour. Med. Sci.*)

" *Influence of the Weather over the Results of Surgical Operations.*—Dr. Hewson's investigations show 'that fatal results from shock occur in a constant ratio with the dryness of the weather, and that those from fever, pyæmia, etc. bear a direct ratio to the opposite state.' The relation of barometric pressure to the results of surgery is expressed in the following facts.

" On the occasion of the 259 operations the barometer was ascending in 102, descending in 123, and stationary in 34.

" Fifty-four of the whole number were fatal: eleven of them were operated on when the barometer was ascending, thirty-five when it was descending, and eight when it was stationary.

" Of the successful cases, ninety-one were operated on with an ascending barometer, eighty-eight with it descending, and twenty-six with it stationary.

"From which it would seem that we got a mortality when operations were performed with the barometer ascending of not quite 11 (10·7) per cent.; of over 20 (20·6) per cent. with it stationary; and over 28 (28·4) per cent. with it descending."—(*Pennsylvania Hospital Reports* and *Cincinnati Med. Repertory.*)

Conservative Surgery.—"Tsiu, thirty-seven years of age, a shopkeeper, at the spring term, received, as retribution for demanding payment of just debts, a severe wound on the right shoulder. It was intended to murder him, but by a sudden jerk, the heavy axe descended upon the shoulder joint, laying it completely open. The arm hung by a small attachment of muscle in the axilla. Amputation would have been the usual course, but from the Chinaman's dislike to part with any portion of his body, the head excepted, the arm was replaced, and a suture with suitable bandages and pads to support the arm *in situ*. The patient remained six weeks in the hospital, and left with the wound healed, and no collection of matter in the joint, and free of pain. The appearance of the shoulder was that of a dislocation of the humerus downward and inward into the armpit. It remains to be seen what use he may be able to make of it."—(*The Sixth Annual Report of the Peking Hospital, by Dr. Dudgeon,* and *Med. Times and Gaz.*)

Work and Waste of the Human Body.—In an interesting paper on the sewing machine, the *Scientific American* makes the following pertinent remarks on this subject:

"A good needlewoman with her needle makes from twenty-five to thirty stitches per minute, while a modern sewing machine will make one thousand; and yet we cannot call this last a *labor-saving* machine, so far as regards the operator on it. As compared with sewing by hand, the sewing with the machine is a really very laborious and fatiguing occupation.

"A general law of mechanics is that whatever we gain in speed must be compensated by increase in power. For every extra stitch over the twenty-five or thirty mentioned above, a greater effort will be needed from the operator, until she may occasionally be taxed to her very utmost.

"Increased power in this case is increased muscular action; muscular action needs fuel for combustion in the human machine; fuel for combustion means increased expense for daily food, a strain on the digestive organs, or a certain and dangerous physical waste of the individual. Our stage and street car horses are changed several times a day, but sewing girls at their machines are expected to work for ten or twelve consecutive hours with intermittent but continually repeated motions of the muscles of the lower limbs. Persons express surprise, if the remark be made that the poor operator is actually wearing herself out, and this much more rapidly than the slight movements she is making would seem to indicate.

"We have before us a very interesting report, addressed to the 'Société Médicale des Hôpitaux,' in 1866, by Dr. Guibout, on the sanitary condition of the many sewing machine operators which came under his personal notice in the public hospitals of Paris. Hollow cheeks, pale and discolored faces, arched backs, epigastric pains, predisposition to lung disease, and other special symptoms too numerous to be specified, were found to be the general characteristics of all the patients.

"In the public houses of correction, where the female prisoners are obliged to work at sewing machines, in order to contribute toward diminishing the public cost of their detention, it has been found indispensable to issue to them supplementary rations over the usual diet of the establishments in order to keep them in good health.

"These disastrous effects must eventually tend toward the deterioration of our race, and deserve, in a humanitarian point of view, the most serious consideration of all friends of mankind."

Automotor.—In relation to this, and in continuation of the above, the same journal observes: "The way to remedy these evils is simple enough, viz., to make the sewing machine an automotor. In large establishments, where numbers of them are in daily use, steam has been applied with success, simple contrivances allowing them to be stopped or their speed to be increased at the will of the operator. Steam, however, is unavailable in private dwellings; and here we meet with a need which American inventors ought long ago to have fully and satisfactorily supplied, that of a 'family' automatic machine.

"The only really practical device of the kind with which we are acquainted (and this leaves much to be desired), is the electro-magnetic automotor invented in France by H. Cazal, which occupies so little space that it may be hidden under a footstool. The fact that the cost of combustion of zinc is thirty times higher than if the power had been obtained by the combustion of coal, is to a certain extent compensated by the advantages of absence of boiler, fires, smoke, smell, or dust. Four of Bunsen's elements are sufficient for driving an ordinary sewing machine at a cost of fifteen or sixteen cents per day.

"The apparatus itself consists in an iron pulley with an externally toothed rim, which revolves freely within a metallic ring, toothed similarly to the pulley, but on its internal surface, so that the points of the teeth of the pulley, face and approximate to those of the outer circle. An insulated wire runs over the pulley, which thus becomes a magnet whenever an electrical current is run through it, and ceases to be so from the very instant that the current is interrupted.

"While the current from the battery is active, each of the teeth of the pulley attracts its opposite on the rim, and if the current were to remain constant, each of these would remain *in situ* and no motion would be imparted to the wheel; to avoid this, a commutator, which is set in motion by the motor itself, regulates the passage of the electrical current through the wire and renders it intermittent. As soon as the apexes of the teeth have placed themselves in opposition, the current ceases and the teeth on the pulley proceed onward, when a fresh current forces them into a second opposition with the next set on the rim, and so on indefinitely, producing a very satisfactory rotary motion. The power being symmetrically disposed around the axis and in each tooth, there is very little friction on the bearings, and no noise produced. The speed can be varied at will, and the simple pressure on a knob or button causes instantaneous stoppage.

"It is our conviction that electro-magnetic, or other small motors, fit for many domestic uses, could easily be devised, superior to even the simple machine of Cazal. We recommend this subject to the immediate attention of our mechanics and engineers. Should they succeed, they will have found not only a source of wealth for themselves, but

they will have contributed their mite toward alleviating some of the thousand hidden miseries incident to our modern civilization, and will thus have acquired a right to the gratitude of their laboring brothers and sisters."

"*Drunkards' Offspring.*—There is no more important problem in medical science than that of the production of physical degeneracy in children, by the intemperance of parents, and it is one peculiarly appropriate for discussion at the present time. A novel point in the consideration of this subject was brought under the notice of the Pathological Society, by Dr. Langdon Down, on Tuesday last. This gentleman exhibited a case of arrest of development and growth in a child five years of age, who had only the intellectual condition of one of nine months. She weighed 22 lbs., and measured 2 ft. 3 in. There was no deformity, but the child preserved its infantile character. Dr. Down called attention to this case as a typical one of a species of degeneracy of which he had seen several examples. They all possessed the same physical and mental peculiarities; they formed, in fact, a natural family. He had known them to live to twenty-two years, still remaining permanent infants—symmetrical in form, just able to stand by the side of a chair, to utter a few monosyllabic sounds, and to be amused with childish toys. Dr. Down (who naturally, from large and rare experience gained at Earlswood, speaks with peculiar authority on such a matter) had found so close a resemblance between the instances, even to the extent of facial expression and contour, that he had been led to regard this variety of degeneracy to have unity of cause. In several cases he had had strong grounds for holding the opinion that these children were procreated during the alcoholic intoxication of one or both progenitors. In the case presented to the Society, there were no antecedent hereditary causes of degeneracy to be discovered. The first child was healthy; then the husband became an habitual drunkard, and there is reason to believe that the second and third children were begotten during intoxication, and they were both cases of this peculiar arrest of growth and development. The husband then entered on an industrious and sober career, and the fourth child, now fifteen months old, is bright and normal in every respect. Dr. Down pointed out that these cases were an entirely different class from those which arise from being the offspring of parents who had become degenerate from chronic alcoholism. The question here broached is a very important one for the physician and the philanthropist."—(*Lancet.*)

"*Hemiplegia following the Inhalation of Nitrous Oxide; Subsequent Typhoid Fever.*—Dr. F. A. Ashford, Assistant Surgeon Columbia Hospital for Women, reported the following case to the Clinico-Pathological Society of Washington:

"Lizzie J., aged 16 years, was admitted to the hospital September 16th, suffering from hemiplegia of left side. Born in Italy; had been in this country but a year or two. Had never menstruated; was well developed; of a lively temperament, and had always enjoyed good health until two weeks before admission, when, having suffered for several days with backache, flushes, and intense odontalgia of four upper incisor teeth, she, believing her trouble arose from them, visited a dentist, and, while under the influence of nitrous oxide gas, had them ex-

tracted. Said, when first aroused, they told her that she had been insensible for two hours. Her head ached very severely, and she started home, but grew faint and dizzy, and remembers little that occurred until next morning, when she found her left arm useless. Pain in the head continued; was at times delirious, so as to require being tied in bed. A week afterward visited a woman who gave her ten 'electric baths;' but they made her worse, and increased the pain in her head. Her lower left extremity soon became affected. When she entered hospital she seemed somewhat anæmic; pulse rather weak, but good; temperature 98° by axillary thermometer; respirations 20. The left facial muscles considerably involved, and, when eating, the food got outside her teeth, so that mastication could not be accomplished except by removing it to the right side. This difficulty arose principally from paralysis of buccinator. Laughed only on one side; her tongue, when protruded, inclined to the left, and at times articulation was difficult. The left side of her head, as she expressed it, felt twice as large as the right; headache frequent. There was loss of sensation, as well as the power of motion in her left upper and lower extremity. No trouble with bladder; bowels sluggish; had not been moved for eight days. Could walk by dragging her foot along and holding to some support.

"The treatment adopted was essentially tonic, with a generous diet, and a pill morning and night, containing $\frac{1}{3}$ gr. of extract of nux vomica, which relieved constipation.

"*October* 1. Could walk up and down stairs with the aid of the baluster, and could carry her hand to her head by a series of jerks, but could grasp nothing with the least degree of force. Sensibility returned, insomuch that she became sensible of pain when the affected parts were pinched, but could not distinguish whether one or two points of a pair of compasses touched her, when separated one-fourth of an inch. Her urine was examined by Dr. Southworth; color and odor normal; sp. gr. 1020; acid; deposit slight, gelatinous, consisting of a few crystals of oxalate of lime and pus-corpuscles.

"Dr. J. H. Thompson, surgeon in charge, noticing a similarity of some of her movements to chorea, suggested the use of bromide of potassium in ʒss doses *ter die*, and spine to be painted with ethereal tr. of iodine. The bromide was continued for ten days, but with doubtful efficacy. (I would here state, that no cerebral symptoms, as noticed by Dr. Hammond, were manifested.)

"*October* 27. Suffering extremely with headache; has been feeling badly for several days, with pains in her back, and anorexia. In the evening, epistaxis was profuse, and continued, at intervals, for several days, entirely relieving her headache. On the 29th, the temperature was 101·8°; pulse 101; respirations 24. On examination of a chart which I have had made, showing the range of temperature, pulse, and respiration up to the thirty-eighth day of fever, I find that, on the sixth day, the temperature was 104·3°, or ranged between this and 103° until the tenth day, on the morning of which it was 100°, and in the evening 102°. The evening exacerbations now became well marked, the temperature on the twenty-first day sinking to 98·6°. Diarrhœa was present on the fifth day, and the rose-colored eruption on the 11th. Her urine, examined frequently, showed nothing very abnormal until the twelfth day, when pus and fatty granular casts appeared; nineteenth day, pus, granular casts, vesicle and vaginal epithelium, and vibriones,

composed the slight deposit. By December 3d, the urine became normal, and no casts could be found.

"Her treatment from commencement of fever consisted of stimulants and nourishment; the former embracing wine and whisky, the latter in the form of beef-essence; occasionally liq. ammon. acetatis, Dover's powder, and ol. turpentine from twelfth to twentieth day. On thirty-third day relapse took place; temperature rose rapidly to 103°, with great prostration; very rapid and weak pulse, and delirium. For several days it remained between 103° and 104°, but soon after declined. During her relapse, Dr. J. H. Thompson seconded my request to use strychnia and belladonna. She took $\frac{1}{24}$ gr. strychnia, and $\frac{1}{2}$ gr. ext. belladonna every six hours until its specific action commenced, which was in forty-eight hours. Afterward took 20 gtt. elix. phos. ferri, quiniæ et strychniæ, *ter die*, and her improvement was rapid in every respect. . . .

"Did the *nitrous oxide* produce congestion of the brain and effusion into its ventricles or tissue, or did the hemiplegia result, as was at first supposed, from exhaustion? (The fact of having taken nitrous oxide came to our knowledge some time after her admission.)

"This young lady was of that age when she ought to have menstruated. Might not her organism have been at that time undergoing menstrual excitement, as manifested by 'pains in her back, flushes, and toothache?' and may not this have been the predisposing cause of her apoplectic condition produced by the gas? Again, what relation exists between her pathological condition and typhoid fever? At this time, when the theory is pressed that typhoid fever is essentially a nervous fever—that Peyer's patches are but tufts or ganglia of the great sympathetic system, might we not discover some verification of its truth in this case?

"*Jan.* 8. Since the above was written this patient has been daily improving, and now walks about with ease. Her face is unaffected, and her extremities are regaining their wonted strength; has no headache, and is anxious to return home. Still takes the phosphates of iron, quinine, and strychnia."—(*Amer. Jour. Med. Science.*)

"*Some Phenomena of Anæsthesia by Protoxide of Nitrogen.*—Mr. F. W. Braine, in a paper on this subject (*British Medical Journal*), observes: It is curious to remark how often, as unconsciousness comes on, the ruling idea is one of noise and motion combined. Some patients think they are seated in, or running after, an omnibus; but many more imagine themselves in a railway carriage, traveling faster and faster, till they suddenly seem to enter a dark tunnel, and then all is a blank to them. Sensual emotions are not unfrequently excited in both sexes. A man, who had been married about three months, stated, on awakening, that he had been dreaming of his wife; and an unmarried hysterical girl certainly gave evidence, by her movements, that she was quite aware of one of the duties of married life; and, moreover, in this case, the idea was still present when she was able to speak, for she addressed the administrator in terms far fonder than the occasion warranted; while another girl, who had behaved in a similar manner, said, 'I hope I have not said anything naughty.' Both of these cases brought forcibly to one's recollection, many trumped-up cases of felonious assault, and

how extremely inadvisable it is to have recourse to anæsthesia without a third person being in the room.*

"At a recent meeting of the Odontological Society, it was stated that the nitrous oxide had been administered in a few cases of pregnancy; but, delivery not having at that time taken place in any one of these cases, the condition of the fœtus *in utero* was unknown. A lady, one of the above cases, whom I put fully under the influence of the gas twice during the eighth month, has just been confined with a fine healthy boy; so that, in this case at least, the gas cannot have interfered with the nutrition of the child, for it weighed at birth eleven pounds and a half.

"When administered to a girl, aged nineteen, with cavities in the apices of both lungs, the patient was insensible at the end of forty-five seconds. The respiration suddenly became very shallow and panting, while, instead of the rosy hue which generally appears over the face and lips on the removal of the face-piece, the lips and face became more dusky before the red tint appeared; the pulse was not affected, but the respiration, for more than half an hour afterward, was very shallow and hurried."—(*Ibid.*)

"*Artificial Respiration in Asphyxiated Children.*—Dr. C. Hanfield Jones communicates to *The Practitioner* the following statement:

"During my presence at a confinement (in my own house) the child was born with several turns of the cord round its neck, and after it was released from these it lay with a swollen, livid face, and no attempt at respiration. As soon as possible I laid it down on its back, and made pressure on its abdomen; then raised it upright on its seat; again laid it down and pressed the abdomen; again raised it upright, and so on. In the recumbent position the diaphragm was, of course, pushed upward and expiration was imitated; in the sitting erect position the weight of the liver and abdominal viscera drew the muscles down, and inspiration was accomplished. The efficacy of the procedure was evinced in a very short time by the young gentleman making such vigorous use of his lungs that his cry was distinctly heard on the second floor below where he was. I do not think Dr. Marshall Hall's or Dr. Silvester's method could have answered better."—(*Ibid.*)

"*Contagion of Consumption.*—Professor Castan has enriched the pages of the *Montpellier Médicale* with a paper on this subject. He has collected together a variety of facts, which appear to show that tuberculosis may be communicated from a diseased to a healthy person by transpiration, breathed air, and living together."—(*Med. Press and Circular.*)

"*Test for Blood.*—We announced some time ago that an important test for blood had been discovered in Australia, consisting of the application of tincture of guaiacum and ozonized ether, which produces a beautiful blue tint with blood or blood stains. The test is excessively delicate; and we happened to be present at a lecture given by Mr. Bloxam, in which he showed some experiments with it, and added that,

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* As nitrous oxide has a special tendency to the genito-urinary organs, it should be administered with care, especially to females.—Z.

in the case of a blood stain twenty years old, he had extracted a single linen fibre, with an almost inappreciable amount of stain on it. The characteristic blue color was immediately induced by the test, and readily detected by microscopical examination. The testimony of so able a chemist leaves no doubt as to the value of the discovery. Ozonized ether, we may remark, is merely a solution of peroxide of hydrogen in ether."—(*Lancet*)

"*Electro-Capillary Actions.*—M. Becquerel, in his sixth memoir, describes the processes which he employed to obtain a great number of hydrated oxides in the crystalline state. In a vessel containing a solution of nitrate of copper, a smaller vessel, one side of which was composed of parchment paper, was placed, containing aluminate of potash. Nitrate of potash was produced, but in the place of aluminate of copper, in the porous vessel crystals of hydrated alumina presented themselves, and on the outside crystals of hydrated oxide of copper formed. By replacing the aluminate of potash by silicates, M. Becquerel obtained hydrated silica sufficiently hard to scratch glass."—(*Chem. News.*)

Cleansing Silver.—Mrs. S. O. Johnson states, in the *American Agriculturist*, that the use of kerosene will greatly facilitate the cleansing of silver. "Wet a flannel cloth in the oil, dip in dry whiting, and thoroughly rub the plated or silver ware; throw it into a dish of scalding soap-suds, wipe with a soft flannel, and polish with a chamois skin. Your silver or plate will look equal to that exhibited in a jeweler's window, and will retain its brilliancy for six months, if once a week, when washed, it is polished with a chamois skin. Some may think it will injure the plate. I have used it spring and fall for five years, and neither plated articles nor silver sustain any injury. Those who use brass andirons will find it equally efficacious in restoring their brightness."

"*Lute for Corks.*—Professor Hirzel, of Leipzig, recommends, as a lute for covering the corks of vessels containing volatile substances (as for instance, benzin, light petroleum oil, and essential oils), a mixture made up of finely-ground litharge and concentrated glycerin; this is made into a paste, and the corks or bungs are covered with it; this mixture hardens very rapidly, is insoluble in, and not at all acted upon by, the said liquids, and is inexpensive, inasmuch as even coarse glycerin, provided it is concentrated, answers the purpose."—(*Dingl. Polyt. Journal* and *Chem. News.*)

"*Ink from Elder.*—According to a German journal, an excellent permanent black ink may be made from the common elder. The bruised berries are placed in an earthen vessel and kept in a warm place for three days, and then pressed out and filtered. The filtered juice is of such an intense color that it takes 200 parts of water to reduce it to the shade of dark red wine. Add to 12½ ounces of this filtered juice, one ounce of sulphate of iron and the same quantity of pyroligneous acid, and an ink is prepared which, when first used, has the color of violet, but when dry is indigo blue black. This ink is superior in some respects to that prepared with galls. It does not become thick so soon; it flows easier from the pen without gumming; and in writing the letters do not run into one another."—(*Sci. Amer.*)

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, JUNE, 1869. No. 6.

ORIGINAL COMMUNICATIONS.

PHYSIOLOGICAL ACTION OF NITROUS OXIDE GAS.

BY THOMAS W. EVANS, M.D., D.D.S., PARIS, FRANCE.

(Continued from page 12.)

IN a communication which appeared in the January number of the DENTAL COSMOS, I endeavored to show that the several causes of the condition commonly called asphyxia gave rise to ante-mortem and post-mortem phenomena, which varied in a manner more or less characteristic of the special cause of the asphyxia. And I established the facts, so far as I could, from the results of a considerable number of experiments, that carbonic acid and nitrous oxide possessed each specific toxical properties, and that, in deaths following the inhalation of either of these gases, the necroscopic appearances were sufficiently distinctive. I furthermore expressed the opinion, that narcosis and death, whether occasioned by the inhalation of these gases, or of anæsthetics of the hydro-carbon series, were the results, primarily, of a specific toxical action upon the centres of innervation, and, secondarily, of an interference with oxygenation. I now propose to develop more fully this opinion or theory, which I shall make the basis of my observations upon the special physiological action of nitrous oxide gas.

I am aware of the difficulties which beset whoever attempts to explain how anæsthetics act. Like the old question, "*Quare opium facit dormire?*" its solution sometimes forces us to assume as facts conditions which at present rest more or less outside of the boundaries of positive knowledge. Any theory which is now presented can consequently be understood as true only in a general sense, and only so far as it is a legitimate and reasonable deduction from such facts as we may absolutely possess.

When nitrous oxide is introduced into the human organism by inhalation, its immediate and specific effects may be formulated as follows:

I. A local action on the blood.

II. A local action on the nerve tissues expressed by

1. Increased action.
2. Diminished action.

Of
- *a.* The cerebrum.
- *b.* The cerebro-spinal axis.
- *c.* The nerves of organic life.

In presenting this statement, I am quite aware of its imperfectness, particularly as regards the denomination of the nerve centres, and the order in which they are represented as affected. However satisfactory it might have been to have been able to indicate in detail the order in which the several intellectual or purely nervous functions are subjected to the anæsthetic influence, this is quite impossible until a better knowledge and a more satisfactory understanding is obtained of the physiology of the nervous system, and the precise relationship to that system of the cerebral functions.

Many years since Flourens formulated a theory of the action of ether upon the nervous system, which has since been reproduced by nearly all the writers upon anæsthetics, even by Giraldès in Baillière's *Nouveau Dictionnaire de Médécine.* According to this theory, first the cerebral lobes are acted upon; then the cerebellum, which Flourens considered to be the seat of the "co-ordinating faculty;" next, the spinal cord begins to lose "its function of sensibility and movement." Finally, the medulla oblongata, the last to yield to the anæsthetic impression, is overwhelmed, and respiration and circulation become impossible.

About the only merit this theory possesses is its perfect simplicity—the ease with which it can be understood and fixed in the memory. Unfortunately, anæsthetics give rise to no such methodic graduation of effect. The moment the slightest anæsthetic influence is felt by the nervous system, the medulla oblongata, the spinal cord, and the nerves of organic life are affected synchronously with the cerebrum and the cerebellum. There can be no absolute difference in the amount of the anæsthetic influence affecting the different nerve centres; and the relative impressionability of the different centres of the intellectual, animal, and organic functions, is by no means constant. That the ganglionic system is, from the very beginning of an anæsthetic inhalation, profoundly affected, is shown by the contraction and subsequent dilatation of the arteries and capillaries; the regulation of the calibre of which Claude Bernard and other physiologists have demonstrated to be under the control of the ganglionic or organic system of nerves. Generally there is an increase of functional activity, both in the central and the peripheral nerves, but sometimes a diminution from the first—always, however, finally a diminution, if the inhalation of the anæsthetic is con-

tinued. When the brain and the nerves of animal life have ceased to function, the nerves of organic life, all the while as truly under the physiological influence of the agent as the brain itself, may still continue to act, but more and more imperfectly and irregularly until finally overwhelmed.

Consequently, in representing the intellectual faculties—the special attributes of the cerebrum—as affected before the nerves of sensation and motion, and these again as affected before an interference with the functions of the nerves of organic life, I have only indicated the general order in which the anæsthetic phenomena manifest themselves. The exceptions to this order are frequent, and are often related—as I shall show in a future paper—to biological problems as interesting as they are obscure.

Local Action on the Blood.—All substances introduced into the animal organism by the respiratory act, traversing the membranous walls of the pulmonary vesicles, enter into the blood, and, uniting more or less freely with its constituent elements, are carried by the circulatory current into every part of the system, and are brought in contact with all the tissues. The blood is the vehicle of absorption and distribution—of absorption and distribution as regards the elements essential to the constructive processes of assimilation, of absorption and distribution as regards the excretory products of disassimilation. Not only is it a vehicle for solids in solution, but it readily takes up vapors and gases.

In healthy blood we always find at least three gases in varying proportions—oxygen, nitrogen, and carbonic acid: usually more of oxygen and nitrogen in arterial than in venous blood, and more of carbonic acid in venous than in arterial blood. These gases also unite, in varying proportions, with the several elements of the blood. Oxygen is rapidly taken up by the corpuscles, and is scarcely absorbed by the serum, which, on the contrary, is an active absorbent of carbonic acid. But the blood also absorbs a multitude of gases, whether brought in contact with it in the pulmonary tissue or more immediately, which do not enter into its normal composition, and which are incapable of being assimilated in the organism: among these is nitrous oxide. Water absorbs oxygen very sparingly—one hundred parts of water taking up but four parts, by volume, of oxygen. On the other hand, at 60° Fahr. one hundred parts of water will take up one hundred parts of nitrous oxide. Blood will also absorb its own volume of nitrous oxide; but its affinity for oxygen is much less marked. The blood corpuscles have apparently about an equal affinity for oxygen and nitrous oxide. The serum has a much greater affinity for nitrous oxide than for oxygen.

But it is to be observed that, when the condition of anæsthesia has been produced by the inhalation of nitrous oxide, the blood is by no means fully saturated with the gas.

I have endeavored to ascertain about how much nitrous oxide it was necessary to introduce into the blood to develop the anæsthetic state—to produce insensibility. In practice, five or six gallons of gas are required, on the average, to put to sleep an adult. Some of this is wasted—nearly the whole quantity is expired during the administration. How much really remains in the system—has been absorbed—when the inhalation is suspended?

Placing a large bell-glass in a pneumatic trough, after filling it with a given quantity of gas, I have caused the gas to be inspired in such a way as that the products of expiration should be received in another glass over the same trough. These products, when the inhalation has been properly conducted, will consist of nitrous oxide, carbonic acid, watery vapor, and the residuum only of atmospheric air in the lungs at the commencement of the experiment. This last component may be balanced by the residuum of nitrous oxide in the lungs at the end of the experiment. If, therefore, we remove the carbonic acid from the second glass, the difference between the volumes of gas in the two jars will show very nearly the actual amount of gas absorbed by the blood at the moment the inhalation was suspended. I have found this difference to rarely exceed *three quarts.*

Supposing this quantity to indicate the amount of gas which has been absorbed at the moment unconsciousness is reached, and admitting, with M. Valentine, that the average amount of blood in the human adult is 30 pounds, it follows that the blood, during an anæsthetic administration, scarcely exhausts the fourth part of its physical capacity as an absorbent of the gas.

When oxygen is taken into the blood, it acts chemically upon the corpuscles, changing their color, as well as upon the protein elements it holds in solution—effects which precede its final action in the processes of nutrition and combustion within the capillaries and peripheral tissues. When carbonic acid is brought in contact with the blood it is absorbed; and, held partly in solution and partly forming more or less complete chemical combinations with the saline constituents of the blood, changes the color of the corpuscles. Carbonic oxide brightens them; ether darkens them; while chloroform only very slightly affects the color of the blood corpuscles.

When nitrous oxide has been absorbed by the blood, its most obvious effect is to change the color of the corpuscles. It is this property of nitrous oxide which is one of the causes of the lividity of the face and mucous surfaces so frequently seen in those subjected to its anæsthetic influence, as well as of the darkness of the blood which immediately flows from the severed vessels. This color of the blood is probably to be partly ascribed to uneliminated carbonic acid; but that nitrous oxide itself possesses, in a high degree, the property of darkening the

blood corpuscles, may be demonstrated, experimentally, by directing, for a few moments, a jet of the gas upon a little arterial blood in a test tube.

This action of nitrous oxide, apparently of the greatest importance, is, however, negative rather than positive; and its induction must be assigned rather to the agency of physical than to strictly chemical forces. Venous blood, dark blood, is simply unoxygenated or imperfectly oxygenated blood. The natural color of the blood is dark, as has been so well shown by M. Bruch. The property of darkening the blood corpuscles has been attributed to many substances—perhaps most frequently to carbonic acid. But recent experiments have demonstrated that the amount of carbonic acid in venous blood, whether free or held in chemical combination, is but slightly in excess of the amount to be found in arterial blood. Magnus, as is well known, often found in arterial blood a greater *absolute* amount of carbonic acid than in venous blood. All experimenters are agreed, however, that the *relative* amount of oxygen is much greater in arterial than in venous blood, as it is also in glandular venous blood than in systemic venous blood; in glandular (red) venous blood the relative excess of the carbonic acid having combined with the alkaline bases in solution in the secretions. Indeed, it should be borne in mind that neither carbonic acid, nor ether, nor nitrous oxide, darkens the blood by entering into chemical combinations with the blood pigment. The blood only resumes its own proper fundamental dark color when once the oxygen has been displaced. This can be shown by displacing the oxygen by hydrogen; or better, by placing a quantity of blood, treated with carbonic acid, under a receiver. Exhaust the carbonic acid, and the blood fails to grow bright—indeed remains quite unchanged. There is no longer sufficient carbonic acid present to affect its color; this color must consequently be occasioned by the absence of oxygen. In fact, bring a current of oxygen to act upon this blood, and it immediately resumes its brilliant arterial appearance. *

Except oxygen, the only known substance which, inhaled, possesses the property of brightening the blood corpuscles in venous blood, is carbonic oxide (see Claude Bernard, "Leçons sur les Effets des Substances Toxiques," p. 195), and it has not yet been clearly shown that this effect is not rather to be attributed to its increasing, in some way, the coloring activity of oxygen, than to any special coloring property which it may itself possess. †

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* Béclard, Physiologie, Paris, 1866, livre i. p. 392.

† Claude Bernard says: "Je ne connais jusqu'à présent que ces deux substances dont l'action se traduise ainsi sur la coloration du sang; et le sang rouge

In a word, whatever gas, excepting perhaps carbonic oxide, usurps the place of oxygen in the blood, darkens the corpuscles; whatever substance, introduced into the blood, diminishes its capacity to absorb oxygen, as morphia, alcohol, etc., darkens the corpuscles; whatever increases the relative amount of oxygen present in the blood, or whatever may interfere, as low temperatures, hibernation, etc., with its *work* in the tissues, and thus indirectly lead to its accumulation in the blood, brightens the corpuscles.* Hence, in general, the color of the blood in living organisms is dependent upon the relative presence or absence of a certain quantity of oxygen.

How, under the influence of oxygen, the blood corpuscles assume a vermilion tint—whether by an unstable chemical combination with the hæmatin, which is probable, or by producing some morphological change, some change of form, which is less probable, are questions which at present do not concern us. It is enough to know that physiological chemistry now teaches us, that whenever oxygen is brought in contact with red corpuscles, whose functional activity has not been previously destroyed by physical or chemical agencies, these corpuscles invariably respond to its presence by assuming a brighter color.

I may here remark, that the theory which extensively obtains in the United States, that nitrous oxide acts upon the blood as an oxygenating agent, is quite disproved by the results of observation. The fact that nitrous oxide contains a greater proportion of oxygen than atmospheric air, is no evidence, even *a priori*, that it possesses a greater oxygenating activity. The deutoxide of nitrogen is, as compared with nitrous oxide, doubly rich in oxygen; but it is not only immediately fatal to animal life, but is even incapable of supporting combustion.

One of the first principles of chemistry is, that "in mixtures all the elements retain their peculiar properties; in the compounds which result from a combination, each element loses the properties which characterize it, and a new body is produced."† In brief, the properties of chemical combinations can never be predicated from a knowledge of the elements which compose them.

The physical properties of nitrous oxide differ widely from those of oxygen, as well as from those possessed by any mixture of oxygen and nitrogen, and the physiological effects of the gas are equally distinctive.

An analysis of atmospheric air shows it to be composed, by volume,

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au sortir de la veine serait, pour nous, un des indices d'un empoisonnement par l'acid prussique ou par l'oxyde de carbone."

But blood brought in contact with the vapor of prussic acid, *not* mixed with air, is darkened; it is only brightened when oxygen is present; hence it is the oxygen and not the prussic acid which brightens the corpuscles.

*See Regnault and Reiset, *Annales de Chimie et de Pharmacie*, 3e série, t. xxvi.

† See Naquet, Principes de Chimie, tome i. p. 4. Paris, 1867.

of 20·90 parts of oxygen and 79·10 parts of nitrogen. Nitrous oxide is composed, by volume, of 100 parts of nitrogen and 50 parts of oxygen. If, therefore, to any given volume of air we add oxygen to the amount of 18·65 of that volume, we shall produce a gas having the elemental constitution of nitrous oxide.

But the physico-chemical properties of this gas, as well as its physiological action, will show it to be a substance quite distinct from nitrous oxide. The gas cannot be reduced to a liquid by pressure: neither nitrogen, nor oxygen, nor atmospheric air have as yet been liquefied. Nitrous oxide is liquefied under a pressure of 50, atmospheres at 45° Fahr. Hence the chemical combination of nitrogen and oxygen in nitrous oxide is accompanied by a vast loss of molecular mobility on the part of the two component gases.

The specific gravity of the mixture will be about two-thirds that of nitrous oxide. It will be very sparingly soluble in water, which absorbs its own volume of nitrous oxide. It will be found to have a stronger affinity than atmospheric air for all oxidizable elements. But nitrous oxide has a much less strong affinity than even atmospheric air for most of the oxidizable elements.

The common experiments used to show the power of nitrous oxide to support combustion, and, inferentially, the process of hæmatosis,—the introducing into the gas a lighted match, or piece of incandescent charcoal or phosphorus, are fallacious. They simply prove, what every chemist knows, that the gas is decomposed and oxygen set free by high temperatures. At 60° Fahr. nitrous oxide exerts no appreciable effect, either upon charcoal or phosphorus exposed to its action an indefinite period of time; nor even upon potassium,—an element so greedy for oxygen as to decompose water, and burst spontaneously into a flame upon its surface.

But whatever the physical differences to be observed between a *mixture* of 50 parts of oxygen and 100 parts of nitrogen, and a chemical *combination* of the same number of parts, by volume, of these gases, they are not greater than the differences to be observed in their physiological effects when inhaled. From the mixture we obtain precisely those chemico-vital effects which have been theoretically attributed to nitrous oxide,—hyper-oxygenation, arterialization of the blood corpuscles, an increased development of carbonic acid, and a general stimulant effect upon the circulatory and nervous system, but nothing more. The characteristic action of nitrous oxide fails to show itself. No specific exhilaration, no anæsthesia follows if the mixture is breathed for hours, as it may be with impunity. Indeed, no effects follow except such as are witnessed after breathing compressed air, or any atmospheric air highly charged with oxygen.

To resume: any deficiency of oxygen in the blood—hypo-oxygenation

—is followed by a decreased arterialization of the whole volume of the blood. In this case the exhalation of carbonic acid is relatively less rapid than its production, and life is impossible when the blood in the arteries has become thoroughly venous in color and character. Any excess of oxygen in the blood—hyper-oxygenation—is followed by an increased arterialization of the blood in the capillaries and veins, as well as in the arteries, and the exhalation of carbonic acid is relatively more rapid than its production. Grave disturbances, death even, supervene when once the blood in the veins has become thoroughly arterial in color and character.

Hence we may infer, from the local action of nitrous oxide upon the blood, that its inhalation does not give rise to hyper-oxygenation, but rather to insufficient oxygenation,—a condition which rapidly complicates the anæsthetic phenomena directly occasioned by the specific properties of the gas.

As I have said, no experimental proof has yet been furnished that nitrous oxide is decomposed in the blood, or forms chemical combinations with it. It enters into the blood as nitrous oxide, and as such is eliminated. It will naturally be inferred from this statement, that the presence of nitrous oxide in the blood is not indicated by the appearance of either structural or chemical changes in the constitution of the blood. Microscopic examinations show no specific alteration of the corpuscles, and the constituent physical properties of the sanguine fluids appear to be unchanged.* Blood which has been subjected to the action of nitrous oxide coagulates as readily as blood which has not been subjected to its influence. In fact, I can only say, so far as I have examined this subject experimentally, that I have been led to the conclusion that the chemical and organic constitution of the blood was not directly changed by the presence of nitrous oxide gas; an opinion which is but

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* Since writing this paragraph, I have read the very interesting article of Dr. McQuillen, in the March number of the Dental Cosmos, on the "*Action of Anæsthetics on the Blood Corpuscles.*" The results of Dr. McQuillen's experiments were substantially those which have been obtained by nearly all the most careful and authoritative European physiologists who have examined this subject.

Dr. McQuillen's objections to Sansom's conclusions, based upon the action of alcohol, chloroform, etc. when in *direct* contact with the blood, are eminently just. Before Sansom's book was written, in 1848, MM. Jules Guérin and Lebert gave in the *Gazette Médicale* the details of experiments, in which this action was elicited. Perrin and Lallemand's comment has settled the value of conclusions based on such experiments, at least in France:

"Mais ces effets, dont il est facile de se rendre compte par le contact d'un liquide doué de propriétés irritantes et coagulantes, ne s'observent plus quand, au lieu de provoquer cette réaction sous le microscope, on examine du sang emprunté à un animal en état d'étherisme."—(*Traité d'Anæsthésia Chirurgicale.* Paris, 1863.)

a natural corollary of the opinions of MM. Bouisson, Chambert de Grorup, Lallemand, and others, as regards the local action upon the blood of the vapors of ether, chloroform, alcohol, etc.

The action of nitrous oxide upon the blood is evidently dynamical rather than chemical. It displaces the gases normally held in solution in the blood, and probably changes at the same time the molecular organization of the sanguine fluids.

The beautiful experiments of M. Poiseuille have shown that the molecular constitution of blood, serum, water, of fluids in general, was remarkably affected by the addition of various toxical or medicinal agents — the molecules of the liquid being apparently brought into such a condition that they move upon each other with more or less facility. Thus nitrate of potash augments *fluidity*, while sulphuretted hydrogen, morphia, alcohol, etc. diminish it. These phenomena are dynamic: they are neither chemical nor vital. Water responds to the action as promptly as blood, and the phenomena are identical, whether witnessed in the capillary vessels of an organism, or in inert capillary tubes.

Nitrate of potash increases the rate of the circulation—functional activity follows, with stimulation of the secretions. Alcohol and opium check the rate of the capillary circulation. The ingestion of these substances is consequently followed by a diminution of functional activity, from a retardation in the passage of the blood,—in fact, intoxication supervenes.* I mention these illustrations of dynamic force because they seem to be particularly pertinent and suggestive. Whether nitrous oxide possesses the special property of retarding capillary circulation, and thus responds to the dynamic law, in accordance with which most of the narcotics act, I am unable at present to say. Indeed, it is quite immaterial, as could I attribute to it such a property, I should only affirm a single consequence of a series of molecular perturbations.

It is very well known that the effects even of oxygen and carbonic acid, in the processes of organic evolution, are obscured by the complicated chemistry of organic combinations and the reactions of correlated physical forces. Mutability is the chemical characteristic of the protein elements of the blood, as well as of those substances termed by Prof. Graham "colloids," which enter so largely into all organized tissues. "It should be noted, too, of these bodies, that though they exhibit in the lowest degree that kind of molecular mobility which implies facile vibrations of the atoms as wholes, they exhibit in a high degree that kind of molecular mobility resulting in isomerism, which implies permanent changes in the position of adjacent atoms with respect to each

* "L'ivresse n'est pas autre chose." (See Claude Bernard, *Leçons sur les Effets des Substances Toxiques*, p. 81.)

other. And it appears that their metamorphoses take place under very slight changes of conditions."—(*Herbert Spencer's Principles of Biology*, vol. i. p. 13.)

Precisely what molecular changes are—even their general influence upon the evolutions of force and structure—is, as yet, unknown. All that we know, all that it is essential we should understand in this connection, is that the phenomena of assimilation and disintegration—of functional life—are not to be explained by the theories of chemical and vital force. As the boundaries of science widen and the horizon of our view is extended, we recognize the existence of new forms of force, and if at present unable to explain their actions, we can at least more readily understand why the phenomena of life are multiform and complex. To effects attributable to catalysis, polarity, and molecular mobility—in a word, to the atomic arrangement of the fluids in living organisms—we must largely ascribe their competence or incompetence to accomplish the specific processes of nutrition and development. "Within the province of form, as well as within that of chemical composition, a vast deal remains to be done before we can place our feet upon all the steps of those two ladders which meet at the top, and which present the image of the double evolution ascending and descending of life."*

(To be continued.)

FILLING TEETH.

BY J. S. LATIMER, D.D.S., NEW YORK.

By some this may be considered a hackneyed subject, but to all who are trying to bear in mind that "whatever is worth doing at all, is worth doing well," I need offer no apology for its introduction.

Suffice to say in advance, that I claim to be original in nothing, but to be a *student* of dentistry, sifting out and appropriating, as professional pabulum, all the useful ideas of my communicative fellow-practitioners.

Before a cavity is filled, it must first be excavated. We take our examining instrument and explore the depressions of the grinding surface of a superior molar. It is well syringed with tepid water, then dried and examined by the aid of a concave mirror. As usual, the anterior depression is sharply angular, and extends to the buccal surface, while the posterior depression is equally sharp, and extends over on to the palatal surface.

This being settled, we next notice whether it will be necessary to remove the septum between the anterior and posterior depressions.

If there is no sharp depression, but the enamel is perfect at that

* Moleschott.

point, and if its removal would not facilitate our approach to the posterior cavity, we leave it—otherwise not. As a rule, sharp depressions at the margins of cavities should be cut out and filled. A strong, sharp chisel opens the cavity on the grinding surface. Smaller chisels follow and cut it out sufficiently to include all defective material about the walls; a flat or bell-shaped bur is then brought to our aid, and the cavity made shapely.

Our "Smith's file-holder" (bayonet-shaped, you remember), in which is a half-inch piece, broken from a No. 88 Stubs' separating file, is just the instrument we want for sawing out the depressions extending to the palatal and buccal surfaces. Stubs' 88 is the thickest of the separating files having parallel sides, and is cut on both sides.

A single file, costing twenty-five cents, will furnish half a dozen or more such pieces as we require for this work.

With this we cut slots deep enough to obliterate the depressions. If the septum between the anterior and posterior depressions is to be cut away, a square-pointed drill does it quickly. A bell-shaped bur gives this connecting canal a proper regularity, if pressed laterally while it is being revolved. If necessary, two or three pits, at suitable points, are made for holding the first pieces of gold. The margins of the cavity are next made smooth and uniform, by the aid of very *finely-cut* files and burs. Nearly or quite all the files made for dentists are exceedingly coarse and quite unfit for our use; some of the smaller ones used by dye-sinkers, and which may be procured of almost any importer of watchmakers' tools and materials, are very finely cut, and can be used to good advantage by dentists.

No jagged edges can have the gold perfectly packed against them. If the edges are beveled, as taught by Dr. Atkinson, we make it very slight,—not more than about ten degrees.

The cavity is syringed, dried, and critically examined. If our work thus far bears the test of the magnifying mirror, we are content; otherwise we go at it again until it is right beyond a peradventure.

We now clear away the excavators, drills, and files, and place upon our tray the pluggers we think will be applicable to the case. These deserve more than a passing notice.

We have three sizes of "foot instruments," with three rows of very fine serrations on each. Some of the finest have only four of these minute serrations, while others are armed with from ten to twenty. These instruments were recommended by Dr. R. W. Varney, whose unsurpassed operations have been accepted as our *beau ideal*, which we aspire to equal. Dr. Varney has been using both the fine files and the finely-serrated pluggers for a long time, and to them is due, in a large measure, the wonderful approximation to perfection we have seen in his fillings.

Dr. Robert Arthur several years ago employed fine serrations, and with them he made beautiful plugs, but his instruments had such shallow and imperfect serrations, that his progress was exceedingly slow and wearisome.

Of the advantage of fine serrations, no one could fail to be convinced on trying them and noticing the absence of pits, the uniformity of density, the nicety of adaptation of the gold to the wall, and the very beautiful finish which the plug takes.

With pluggers so shaped as to enable us to reach every portion of the cavity, we pass to look to our gold. Several makers are furnishing very excellent foils. Each operator has his favorite maker. Dr. Atkinson has lately been using No. 10 foil, and claims to produce excellent fillings with it. I prefer No. 2. The gold, when it comes to my hands, is quite adhesive. The beater anneals it over a flame, and puts it at once into books which have been dried in an oven.

Annealing not only produces a molecular change in the gold, making it softer and more pliable, but it drives off the gases which deposit upon the exposed surfaces of bodies, and thus permits absolute contact of gold with gold. It is incorrect to call adhesive gold foil "hard;" annealing softens foil which is one-thousandth of an inch in thickness precisely as it does gold plate which is twenty-five times as thick.

The lamina of adhesive pellets cohere at the points of contact; on which account they do not slide on each other, and hence the greater difficulty of condensing them.

It follows, then, that *adhesiveness is always obtained at the expense of adjustability.*

For some places I desire the greatest adjustability; in others, as I cannot have the maximum of both in any single portion of gold, I am glad to accept a compromise; while for the completing portions of foil I desire the greatest possible adhesiveness, and the intractableness of the gold is not an especial detriment for that part of the plug.

If we take the foil from the book, spread it upon a piece of paper, and leave it exposed to the air for from twelve to twenty-four hours, though no molecular change has taken place, a deposit of gases has been made upon the surfaces which renders it perfectly non-adhesive.

It is then replaced in the book, and is truly "accommodation foil."

As preparing the gold long beforehand does not injure its working qualities, we can prepare a quantity sufficient for two or three days, at our leisure, and so save time for ourselves and our patient. We have our gold prepared from whole sheets of No. 2, folded into ribbons about one-tenth of an inch in width, and cut into sections varying from a fifth to three-quarters of an inch in length.

How can we best keep the cavity dry? is the next question. If the rubber dam can be successfully applied, that is decidedly preferred, and

we increase the blaze of our Bunsen burner, heat the point of a suitable instrument, and melt two holes through the rubber at proper distances to include the tooth to be filled and the one anterior to it. Two or three pieces of floss silk, neatly waxed, are conveniently placed, and we are ready for work.

(To be continued.)

INDISCRIMINATE EXTRACTION OF TEETH.

BY M. LUKENS LONG, D.D.S., PHILADELPHIA.

The introduction of nitrous oxide for the extraction of teeth has opened a wide field for quacks to reap a rich harvest; and some unprincipled men boast, like Samson, of having slain or "extracted" thousands, not *with* the weapon used by Samson, but *from* the "jawbones of the asses" who seem to think diseased or decayed teeth should be eradicated like unhealthy growths, warts, corns, etc.

The community do not seem to require, on the part of the individual in whose hands they intrust their lives, any knowledge of the remedies to be applied in the event of any *little* difficulty occurring, but are perfectly satisfied if assured that the gas is "fresh every day." Thousands have passed through safely, why should they be afraid? How much better to have the offending members, which have been or may become troublesome, removed at once, than to have them "punched at" (as they politely term it) and examined, to see if there is any possibility of saving them. In fact, it seems to be the practice of these "tooth-pullers" to extract every tooth that the patient is willing to pay for parting with.

The deciduous teeth are prematurely removed by them to correct irregularity, causing contraction of the maxillæ, and rendering a perfect, permanent denture almost impossible.

It is rather surprising that a majority of the members of the State Dental Society should oppose the insertion of a clause into the proposed law to regulate the practice of dentistry, requiring of every one hereafter entering the profession to attend at least one full course of lectures at a dental college. If our object is to elevate the profession, would not the best plan to accomplish it be to demand of all those who enter it the possession of a better knowledge of the diseases to which the teeth are liable than is usually acquired in the laboratory of a preceptor?

To arrest the wholesale extraction now practiced, educate the dentist, and the people will, from him, learn to have a better appreciation of the value of their teeth. It is very probable that many of the thousands of teeth sacrificed could have been saved by judicious treatment; and,

as a good surgeon endeavors to cure an injured limb instead of amputating it, so the dentist should strive to restore the diseased dental organs to their normal health and usefulness, if it is within the limit of possibility to do so. If he does not have the time to devote to their treatment, he should be honest enough to advise the patient to place himself under the care of some one known to be qualified for the performance of that important duty. There are many noble-hearted men who, in the practice of their profession, seem to be actuated solely by the desire to confer a benefit upon their patients, and they are well remunerated by those who appreciate their good intentions; why cannot the extractor be governed by the same conscientious regard for the welfare of those who ask his assistance, instead of taking advantage of their sufferings to add to his "ill-gotten gains," by depriving them of organs which should be retained?

What would be thought of oculists, who claimed the confidence of the community in their professional ability and standing as such, because they confined their practice exclusively to the extraction of eyes without pain? Is there any sane person in this broad land who would intrust his eyes to the hands of such men?

It is to be regretted that men who enjoy a reputation as physicians and dentists, should so far forget their self-respect as to lend their names and give countenance to such quacks. Empiricism in every form should be discouraged by all who are desirous of seeing pure science advance.

In the performance of every operation, a strict regard for the best interests of the patient should control the action of the dentist, and he will find it not only pecuniarily beneficial to himself, but will have the satisfaction of receiving the heartfelt thanks of those who have intrusted to him the care of those organs intended by an all-wise Providence to serve the purposes of mastication during the lives of their possessors.

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

BY GEO. W. ELLIS, M.D., D.D.S.,

LATE PROFESSOR OF DENTAL PHYSIOLOGY AND OPERATIVE DENTISTRY IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 241.)

After one attack of convulsions a predisposition is often engendered which we must endeavor by quieting and toning treatment to reduce and obliterate. "Recently attention has been directed by Dr. Fliess, of Neusalz, to a *paralytic* condition of the limbs which sometimes occurs during dentition." "It is much less frequent during the first than during second dentition. Its attacks are almost always sudden. The

child is cheerful, as playful as usual, has a good appetite, and goes to bed in the evening apparently quite well. At first perhaps it sleeps very quietly, but it soon becomes disturbed, tosses about in a restless manner, groans and screams out in its sleep, grinds its teeth, is thirsty, has some heat of the head, and toward morning is rather feverish. On the next day, when perfectly awake, it is discovered that the child is unable to use one of its arms, or, in rare cases, an arm and a leg. If the arm alone be paralyzed, it hangs down, useless by its side ; it is warm, but in consequence of the gravitation of blood in the limb, the joints of the hand and fingers are of a bluish-red color and swollen. The sensibility of the arm is either entirely lost or is very obtuse ; and the excito-motory power can be but little, if at all, excited by stimulation." The duration of the attack varies from one or two weeks to as many months, and in some cases continues persistent and incurable ; under proper treatment, however, the limb gradually regains its lost power, preceded by a prickling or heated sensation. "According to Dr. Fliess, in cases of dental paralysis it is generally the molar teeth that are at fault; much more seldom the incisors ; at least those are the teeth that are mostly protruding about the time of the attack." In these cases prompt surgical interference will seldom fail to give relief. The following case is related by M. Robert:

"A child, after having suffered greatly from difficult dentition, apparently died, and was laid out for interment. M. Lemonnier, having some business at the house of the nurse, with whom the child resided, after fulfilling the object of his visit, was desirous of ascertaining the condition of the alveola. He accordingly made a free incision through the gums ; but, on preparing to pursue farther his examination, he perceived the child to open its eyes, and give other indications of life. He immediately called for assistance ; the shroud was removed from the body, and by careful and persevering attention the child's life was saved ; the teeth in due time made their appearance, and its health was fully restored."

For paralysis, the general treatment is the same as that pursued for the relief of convulsions, and has in view the derivation of nervous and circulatory excitement from the brain and spinal cord. Upon its exact nature authorities differ, some contending that it is exclusively cerebral, while others regard it as strictly spinal ; yet from the reliable testimony of both we come to the conclusion that it may be either one or the other, or the two combined.

That cerebral or spinal hemorrhage or serous effusion does occur in the majority of cases is no doubt a fact, yet we still believe that any cause capable of temporarily or permanently interfering with or arresting the conductive power of a nerve tract will produce the same, though a more trivial, result ; if, for instance, from abnormal dentition a

nerve be unduly irritated, such reflex excitation may occur as to produce convulsions, or if the provoking cause be farther intensified, we may have a complete suspension of function from the exhaustion of excitability; or again from an unnatural stimulus being presented which the muscle cells are unable to convert into contractility, we have a partial suspension of nutrition and entire loss of functional power.

Even when effusion, bloody or serous, has taken place within the cerebral or spinal membranes, we have hope from the fact that the results are not universally fatal, but that under proper treatment calculated to promote absorption of the effused fluid the case may recover, a happy result which will occasionally occur spontaneously.

The measures mostly relied upon may be thus briefly enumerated: Purgatives by the mouth or per anum; warm bath to the lower half of the body; stimulating embrocations along the spine and to the lower extremities; leeching or bleeding; doses of calomel, which may be combined with tartarized antimony and nitrate of potassa; cold lotions to scalp; mild and unstimulating diet, etc.

Spasm of the Glottis, or *Laryngismus Stridulus*, may occur as the result of dental irritation, and M. Robertson classes it among the exciting causes. Says Condie: "Dentition is unquestionably one of its most common predisposing causes; nearly all the cases upon record occurred during or immediately preceding the evolution of the first set of teeth; and we have few instances of the disease occurring beyond this period."

In severe attacks the efforts at respiration are vehement,—the mouth is distended, the nostrils dilated, the head thrown back, the diaphragm and abdominal muscles powerfully contracted, the countenance expressive of great anxiety and distress, pale, and marked by the black turgid veins loaded with carbonized blood; the backs of the hands and insteps are swollen and hard, and the thumbs, fingers, and toes rigidly flexed. As a general thing, the attacks are seldom and of but a minute or two in length; they may, however, become alarmingly frequent, and prolonged to even fifteen or thirty minutes.

The affection may be induced by a variety of causes, and hence the conflicting opinions in relation to its origin. Some believe it to result from the pressure of enlarged thymus or cervical glands; others from acute hydrocephalus; others from the irritation consequent upon disordered functional action—for instance, in the alimentary canal; others from impure and vitiated air; while again it is believed to be favored by the lymphatic temperament; and Dr. Jacobi says: "Whenever a child with laryngismus is brought to me, my first attention is given to the occiput and epiphyses, as my first prescription is invariably the regulation of diet and the use of iron," showing that he indorses that view which finds a close and intimate relationship existing between rachitis and this nervo-muscular manifestation. That laryngismus is

often the indication of a deep-seated anomaly is unquestionably true; that post-mortem investigations have shown the frequent congestion, effusion, or inflammation of the cerebral or spinal membranes is also a fact; yet from the absence of any uniform lesion we conclude that it is a nervous disturbance producible by any cause sufficiently powerful and so located as to disturb the nerves distributed to the muscular apparatus of the glottis.

"According to Dr. Hall, the disposition to spasm of the glottis consists in a peculiar susceptibility of the excito-motor property of the nervous system; the immediate cause of the attacks being the action of sources of irritation or excitement of this property; the most obvious of which are dentition, indigestible food, morbid alvine matters, external agents, and mental emotions."

There are certain authorities who regard it as a passive or relaxed condition of the muscles permitting a collapse of the superior respiratory passage; but it is almost universally considered due to an active contraction and consequent constriction of the glottis, accompanied in severe cases with convulsive movements of the diaphragm and other respiratory muscles.

It is stated that cases complicated with cerebral disease seldom occur before the commencement of dentition; and Dr. Rees remarks that if the patient survive the appearance of the first molar teeth the case generally terminates favorably. From these statements we observe that the prognosis will vary in accordance with the nature of the exciting or primary cause: if this be serious and deep seated, less encouragement is derived than when it is more accessible, peripheric, and removable; yet this fact alone is not an unerring indication, for in some instances the mildest form will suddenly, without any premonition, assume an alarming and fatal violence, while again the most threatening characters may gradually abate until not a vestige of the disorder is left.

The treatment during the paroxysm consists in placing the patient in an upright position, with the head inclined forward, and exposed to a free draught of pure cool air, throwing or sprinkling cold water upon the face, slapping upon the back and nates, and thoroughly freeing from pressure the integuments and vessels of the neck. If these simple measures fail, the child may be placed in a warm bath, and while the body is immersed cold water should be thrown upon the face, which will generally excite a sudden and forcible inspiration terminating the spasm. Ammonia to the nostrils, the irritation of the fauces with a feather to induce vomiting, application of a piece of ice wrapped in a cloth to the epigastrium and lower parts of the sternum, have all proven efficient in solving the spasm. An enema containing assafœtida or turpentine is said to operate well in violent attacks. If, however, death be threatened

from asphyxia, artificial respiration may be resorted to by blowing into the mouth, holding the nose, and compressing the trachea against the œsophagus ; after having secured the ingress of air, its expulsion can be accomplished by pressure upon the thorax and abdomen ; an alternation of these movements will oftentimes restore respiratory regularity. If, however, this offers no encouragement, we should speedily resort to the operation of tracheotomy as the only source of hope. It is advised by Dr. Hall to make an examination of the gums immediately after the fit, and to incise any irritated, inflamed, or swollen part, and even to perform the operation where no such external indications are present, but where obscure difficulties may be suspected.

The bowels should be kept regular by the use of gentle purgatives or enemata.

Dr. Reid, who seems to have bestowed considerable attention upon this affection, recommends the use of antispasmodics, as assafœtida and musk, which he remarks will occasionally arrest cases of simple convulsions arising from teething. In addition to these, a narcotic and stimulating embrocation applied to the spine, chest, and abdomen is directed as advantageous. In conjunction with medication, cleanliness, change of diet, cool fresh air and exercise, hasten and establish good results.

We here complete our review of the causes, course, and effects of abnormal dentition. I have endeavored to rehearse them with impartiality, and striven, while avoiding the attachment of undue importance, to give them the prominence which I conceive they merit ; and although mention has been made of several affections which may be but very seldom found attributable to dentition, I have omitted the notice of many others which may occasionally spring from such source. It has unquestionably fallen under the observation of most practitioners, that a predisposition or diathesis may be aroused by the irritation of teething, and the same cause will prove influential in the modification or aggravation of preexisting disease ; hence, although oral treatment may in the vast majority of cases be properly omitted, a practitioner who neglects to investigate and consider the developmental trains therein progressing is guilty of overlooking a most important and essential feature of diagnosis.

MENDING PLASTER MODELS.

BY M. L. CHAIM, NEW YORK.

Wax and resin, or shellac varnish, is recommended in the last number of the Dental Cosmos for the above purpose.

I would suggest the use of liquid silex. Wet the two surfaces with it, and allow a few moments for it to dry. It will be found very useful in cases of accident to a cast.

PROCEEDINGS OF DENTAL SOCIETIES.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY T. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

The sixth annual meeting was held on Tuesday evening, May 4th, 1869.

The minutes of the last annual meeting were read, and a synopsis of the year's proceedings, in which comparisons of the work of the respective years were made and given in tables, exhibiting a marked advancement of the standing of the Society. The increase in numbers, both of members upon the rolls and in attendance at the meetings of the past term, evinced, in the most unmistakable manner, the growing interest manifested in this body and its objects. It was felt that such solid evidence as this must cheer those, both at home and abroad, who are interested in the elevation of the dental profession.

The list of members as announced was, active, 46; corresponding, 31; and honorary, 14; making the total 91; to which, judging from the nominations made, there will be added at least a dozen more at the next meeting.

The published proceedings of the Society, during the past year, comprised matter mostly devoted to the consideration of subjects that present the varied character required to make a broad basis of knowledge, and hence of corresponding value, in many cases, to both the scientist and the dentist.

The plan of organization had been carried out by holding fourteen meetings, one of the latter being devoted to the transaction of the yearly business, while the remaining thirteen were occupied by the consideration of five selected subjects for discussion, the exhibition of specimens,—among which those for the microscope bore a very large share,—and assisting in the work of gathering a convention of the dentists of this State, with the view of forming a society having jurisdiction over all the local organizations represented in it.

At intervals a series of experiments were conducted before the Society, illustrative of the subject of anæsthesia and the effects of anæsthetic agents upon the blood, with reference to the appearance of the corpuscles, etc. Four public lectures were delivered, under the auspices of this body, by professors from both this country and Europe.

A new feature in the transactions was a *conversazione*, given by its members, in honor of the delegates to the State Dental Convention, which was held in this city.

The various officers and committees then presented their respective reports, which were accepted, and, at the suggestion of the delegates to

the American Dental Association, Prof. Kingsbury offered the following resolution:

Whereas, The American Dental Association has framed a code of ethics, and also made it obligatory upon all State and local societies to adopt said code to entitle them to representation in that association;

Resolved, That this Society accepts such code of ethics as a matter of expediency, rather than from a conviction of any special advantages to be derived from the same.

Upon being put to the Society, the above was carried; the delegates to the State Dental Society suggested the necessity of some action upon the requirements of the latter, which resulted in the adoption of the following:

Resolved, That this Society formally accepts the Constitution and By-Laws of the State Dental Society of Pennsylvania.

Resolved, That the attention of this Society is directed to Article III., Sects. 1, 2, and 3, Article VII., Sects. 1, 2, 3, and 4; and that the proper officers are hereby instructed to comply with the requirements of the above articles and sections.

The following amendment to the Constitution was then offered, and will be acted upon at the next annual meeting:

"Any one who shall procure a patent for a remedy or instrument used in medicine, surgery, or dentistry, or who shall keep, or profess to keep, as a secret from the profession, any compound, prescription, or mode of treatment, in either of the above professions, or who shall enter into a collusive agreement with an apothecary to receive pecuniary compensation for patronage for sending his prescriptions to said apothecary, or who shall hereafter give a certificate in favor of a patent remedy, or charlatan, shall be disqualified from becoming or remaining a member of this Society."

No debate was entered into upon the subject, as the general sentiment seemed to be that some such clause would be advantageous, and if not sufficiently searching as offered, it could be amended before being finally passed.

It was also moved that the fourth article of the Constitution be amended by inserting the word "Curator" immediately after the word "Librarian," in the list of officers, and that the By-Laws be amended by having an article inserted to read:

"The Curator shall take charge and keep an accurate record of all the specimens presented to the Society, with the history of each, so far as he can obtain it, and the names of the donors."

The order of business at the discussional meetings was then amended to read: "Donations to the Library *and Museum.*"

The Society then went into an election for officers, with the following result:

President.—J. H. McQuillen.

1*st Vice-President.*—C. A. Kingsbury.

2d *Vice-President.*—J. L. Suesserott.

Corresponding Secretary.—Thos. C. Stellwagen.

Recording Secretary.—Wm. H. Howard.

Treasurer.—Wm. H. Trueman.

Librarian.—M. Lukens Long.

Curator.—S. S. Nones.

Executive Committee.—Drs. J. L. Eisenbrey, Edward L. Hewit, C. M. Curtis.

Delegates to the American Dental Association.—Drs. Jas. S. Gilliams, Louis Jack, Cyrus N. Peirce, Edward L. Hewit, J. L. Eisenbrey, E. H. Neall, Geo. F. Platt, Wm. A. Breen, Wm. C. Head, and Alonzo Boice.

Delegates to the State Dental Society of Pennsylvania.—Drs. Wm. H. Howard, Edward L. Hewit, C. W. Curtis, J. L. Eisenbrey, Chas. E. Pike, Ambler Tees, Cyrus N. Peirce, Robt. L. McClellan, Jos. H. Borneman, and Louis Jack.

The President then delivered his annual address. As a historical document, it was so much prized that the members considered that it would be of interest as a guide, both to the student and practitioner of dentistry; they therefore unanimously requested that a copy be furnished to the Secretary for publication in the transactions of the Society.

The Corresponding Secretary suggested that he should be empowered to have a circular letter printed and sent to the members of the Society, and such others as might be likely to comply, requesting them to forward written communications and essays for reading at the meetings. A motion was made and carried to that effect.

The Executive Committee reported that they had chosen Dr. Howard as the essayist for the next meeting. After the adjournment of the Society, the President exhibited some microscopical specimens of the Trichina Spiralis, that he had prepared from the biceps muscle of a lady who died recently in Illinois; also the Acaris Sacchari, or Sugar Insect.

Adjourned.

CHICAGO DENTAL SOCIETY.

BY CHARLES R. E. KOCH, SECRETARY.

The annual meeting of the Chicago Dental Society took place on the evening of April 5th, 1869, the President, Dr. M. S. Dean, in the chair.

Members present.—Drs. Ellis, Noyes, Crouse, Clapp, Dunne, Sherwood, Freeman, Brown, Koch, Cushing, Allbaugh, Garnsey, Swain, and Young.

Dr. S. S. White, of Philadelphia, and Mr. S. R. Bingham, honorary members, were also present.

Dr. Clark, of Galesburg, was present by invitation, to present his patent of mounting teeth on the aluminium base by means of rubber.

An election of officers for the ensuing year resulted as follows, viz.:

President.—Dr. J. H. Young.

Vice-Presidents.—Drs. E. D. Swain and A. W. Freeman.

Recording and Corresponding Secretary.—Dr. C. R. E. Koch.

Treasurer.—Dr. Wm. Allbaugh.

Librarian.—Dr. J. Ward Ellis.

Executive Committee.—Drs. G. H. Cushing, M. S. Dean, and M. W. Sherwood.

The Committee on Essays and Essayists was continued from last year, viz.: Drs. Allbaugh, Cushing, and Young. (This committee appoints twelve essayists on subjects for the ensuing twelve monthly meetings, so that the essayists as well as the Society know what to be especially prepared for at each meeting.)

Dr. Young made brief remarks in acknowledgment of honor conferred.

A vote of thanks to the retiring officers, and the Committee on Essays and Essayists, was passed.

Dr. M. S. Dean read an able resumé of the work of the Society during the past year. He said, although the numerical increase had not been large (only five new members having been added during the year), yet there were marked signs of progression; the number of written essays which have been read before the Society lacked only one of being half of all that had been delivered previously in a period of over four years since the organization of the Society.

The subjects written upon during the last year, and the names of the essayists, are as follows:

Filling Teeth, Dr. R. Gibson; Treatment of Six-year Molars, Dr. G. H. Cushing; Filling Teeth, Methods, Preparation of Cavities, Anchorage, etc., Dr. Wm. Allbaugh; Treatment of Exposed Pulps and Filling of Pulp Cavities and Canals, Dr. M. S. Dean; Treatment of Alveolar Abscess and its Complications, Dr. C. R. E. Koch; Nitrous Oxide Gas, as Compared with Chloroform and Ether as an Anæsthetic in Dentistry, Dr. S. B. Noble; Extracting Teeth—When, Why, and How to Extract, Dr. A. E. Brown; Structure of Pulps and the Practical Lesson it Teaches, Dr. E. D. Swain; Causes Retarding Dental Progress, Dr. J. W. Ellis.

In addition to these, mechanical dentistry and many other topics have been introduced and discussed.

The *subjects* treated in these essays have been discussed fully and freely by the members of the Society, and the *grounds* taken by the essayists thoroughly reviewed and criticised.

The *method* of discussion adopted by the Society, at first discursive

or regular, and finally merging into an informal interchange of views, has been the means of disclosing the theories and practice of each member—each in his turn *instructing*, and all being instructed. We have thus by comparison secured knowledge which can be acquired in no other way.

If I can justly estimate the character and merits of the essays, they have been carefully and thoughtfully prepared, and display a thorough knowledge of the subjects treated by their writers; many of them, indeed, have exhibited a clearness of thought and expression and elegance of style of which any literary society might well be proud.

Dr. A. W. Freeman moved a vote of thanks to S. S. White, for the free use of his dental depot for the meetings of this Society; to S. R. Bingham, the gentlemanly manager, and the employés of the same, who have denied themselves to add to the comfort of the members of the Society and make due preparations for the meetings, which was unanimously indorsed.

Dr. S. S. White replied that he was happy to extend to the Society the free use of his new dental depot for all time to come; and made some other very kind and encouraging remarks.

Dr. Clark, of Galesburg, was then called upon to explain his patent for mounting teeth on aluminium, gold, and platinum plates by means of rubber.

His patent consists, in its essential part, of thoroughly roughening the swaged plate, by means of a graver or other suitable instrument, so as to throw up burs at opposing angles, doing away entirely with the necessity of counter-sunk holes or soldered attachments. Dr. Ellis said he could not see anything new in the patent, and thought that it would hardly be worth while to buy an office right (which the gentleman proposed to sell for two hundred dollars), as teeth could easily be attached to these plates by other means, and should not hesitate to attach them by this means, if he thought best, without fear of successful prosecution for infringement.

Dr. Young said that for many years in the manufacture of continuous gum teeth he had roughened the plate. Had also mounted teeth on gold plate without soldered attachments.

Dr. Koch had roughened gold plate and attached teeth by means of rubber for years, doing away with soldered attachments, but adding counter-sunk holes at the edge of the alveolar border of the plate to give more security.

Dr. Clark said in conclusion that any one who had used the process previous to his patent he should of course abstain from prosecuting.

Adjourned.

HARRIS DENTAL ASSOCIATION.

BY WM. NICHOLS AMER, LANCASTER, PA.

The second annual meeting of the Harris Dental Association of Lancaster, Pa., was held at New Holland, Lancaster County, on Thursday May 6th. The attendance of so large a number of members was sufficient evidence of their unabated interest in the prosperity of the Association, while the reports of the Secretary and Treasurer disclosed a favorable condition of its affairs. The election of officers resulted as follows:

President.—Dr. Samuel Welchens.

Vice-President.—Dr. P. W. Hiestand.

Secretary—Wm. Nichols Amer.

Treasurer.—J. G. Moore.

Executive Committee.—Drs. John McCalla, J. F. Hoffer, M. H. Webb.

Delegates to State Dental Society.—Drs. Hiestand, Moore, and Webb.

Delegates to American Dental Association.—Drs. Amer, Hoffer, and McCalla.

The act incorporating the State Dental Society was read, followed by remarks on the fate of the bill presented to the last Legislature, and the probable amendments necessary to secure its passage next winter. Dr. McCalla, the retiring President, delivered the annual address, and presented certificates of membership to those present. After the transaction of the ordinary business, and the reading of an essay by Dr. Welchens, the Association adjourned to meet in August, at Ephrata Mountain Springs.

BIOLOGICAL AND MICROSCOPICAL DEPARTMENT OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

At the stated meeting of the department, held April 19th, 1869, the respiratory system of insects was illustrated to the members by Mr. Wm. H. Walmsley, who exhibited a number of slides expressly prepared by him for the purpose. Before describing them, it may not be amiss to make a few remarks on this interesting subject.

The existence of a respiratory system in insects is contested by some even to the present day, but any one can readily recognize the apparatus by which the respiration is effected. Malpighi was the first to prove, in 1669, the existence of such a system, and that air is as indispensable to insects as to other living beings.

In insects the respiratory apparatus is essentially composed of membranous tubes, the innumerable ramifications of which penetrate every portion of the body, wings, and legs, burying themselves in the different organs, much as the fibrous roots of plants bury themselves in the soil. These tubes are composed of an inner and outer membrane, between

which is coiled an elastic spiral thread of a semi-horny consistency, which is firmly attached to the inner membrane, but adheres quite loosely to the external. This thread serves to preserve the cylindrical form of the duct under all circumstances, even when not distended by air, and is prolonged without interruption to the extreme points of the finest ramifications.

These vessels or ducts are called tracheæ. Their communications with the air are externally established in different ways—generally by openings on the sides, two in each segment being the usual number, one on either side, in most larvæ. But in the perfect insect several of them are closed, especially in the thoracic region.

These openings, termed spiracles or stigmata, vary greatly in different insects, so that in scarcely any two species are they exactly alike. They are nearly all furnished with some kind of a sieve at their entrance, by which particles of dust or other foreign substances are prevented from entering the air-passages. This sieve is sometimes composed of finely branched hairs, surrounding the margin of the opening, and interlacing at its centre; sometimes of a membrane perforated with minute holes. In some aquatic larvæ, which breathe air, one of the spiracles of the last segment of the abdomen is prolonged into a tube, the mouth of which remains at the surface while the body is immersed, as in the larva of the Mosquito. In many of the aquatic larvæ, the external breathing apparatus consists of leaf- or brush-like appendages, into which the tracheæ are prolonged, the air being absorbed from the water and conveyed to the interior of the body, much in the same manner as by the gills of a fish. In the larva of the Dragon Fly, the lining membrane of the termination of the intestine is folded into an immense number of plaits, each containing minute ramifications of the tracheal system, and water being slowly drawn in, bathes this surface, which absorbs the air, and conveys it to all portions of the body.

There being apparently no distinct circulatory apparatus in insects, the blood flowing through irregular channels formed by the empty spaces between the different organs, its aeration is provided for by the distribution of the tracheal vessels to every portion of the body, wings, etc., as we have seen. Sometimes, in addition to this system of tubes, we have an assemblage of elastic membranous pouches of various sizes, expanding when the air enters and contracting when it leaves them, being altogether destitute of the elastic fibre found in the tubular tracheæ. These, which are vesicular tracheæ, are generally found in those species whose flight is frequent and sustained, as the Bee, Fly, Butterfly, etc.

Mr. Walmsley then exhibited to the members the following specimens, fully illustrating the foregoing remarks:

Spiracles of various Caterpillars, Common Fly, Cricket, Wasp, Bee, etc, showing a great variety of forms and contrivances for preventing introduction of dust, etc.

The larva of a Mosquito, showing prolongation of the spiracle of last segment of the abdomen, which is thrust above the water to receive the air, as any one can witness for himself during the summer in any rain-butt.

The larva of a Dragon Fly, showing distribution of tracheal vessels in membranous folds of the intestine.

Leg of Katydid, showing tracheal vessel extending through it.

Trachea of Silk Worm, mounted in fluid, showing its complete structure, inner and outer membrane, and spiral fibre.

The Pygidium of a Flea, Pediculis Capitis or Human Head Louse, showing the complete respiratory system, the tracheæ entire in position, and its connections with the stigmata in each segment of the body.

An unknown larva from rotten potatoes, the spiracles of which consisted of two funnel-shaped bodies upon the upper portion of the posterior segment, each opening directly into a large tracheal vessel, while from either side of the head proceeded a branchial appendage consisting of five finger-shaped bodies, branching from a single stem which was connected with the tracheal system within the body.

These two preparations were very instructive and satisfactory to the large number of members present.

CHICAGO MICROSCOPICAL CLUB.

BY HENRY F. MUNROE, SECRETARY.

The regular monthly meeting was held with Drs. Jones and Lyman, Tuesday evening, April 27th, the President, Dr. Allport, in the chair.

Present: Messrs. Allport, Lyman, Jones, Hankey, Munroe, Durham, Bullock, Boerlin, Carbutt, Tracy, Hay, and Briggs, and several invited guests.

The special order of the evening was the exhibition of a Möller's Diatomaceen Typen Platte, by Mr. S. A. Briggs.

This type-plate consists of 406 specimens of the Diatomaceæ, representing 338 species, arranged in four series, the whole occupying a surface equal only to $\frac{1}{64}$ of a square inch. With dark-ground illumination and a low objective, the whole is brought to view in a singularly beautiful way.

Each of the four series is composed of diatomaceæ arranged in six horizontal lines. Fine specimens of *Eupodiscus argus* mark the corners of each series, and the whole are so nicely placed as to admit of easy reference through the manuscript catalogue accompanying the slide. The systematic arrangement is that of Grunow, of Vienna. The following table shows the different families illustrated on the slide, with the number of specimens of each:

Series I.—	Epithemieæ	41	
	Meridioneæ	12	
	Diatomaceæ	27—	80
Series II.—	Tabellarieæ	23	
	Surirelleæ	52	
	Amphipleureæ	1	
	Coconcideæ	23—	99
Series III.—	Achnantheæ	17	
	Cymbelleæ	15	
	Gomphonemeæ	16	
	Naviculaceæ	79—	127
Series IV.—	Ichmieæ	2	
	Biddulphiaceæ	24	
	Eupodisceæ	9	
	Melosireæ	46	
	Chætocereæ	3—	84
	Eupodiscus argus (at corners)		16
	Total number of specimens		406

Dr. Walter Hay reported an aggravated case of trichiniasis as occurring during the current month in the southern part of the State, and exhibited several preparations from the biceps muscle of the patient (a girl thirteen years of age), showing the presence of this entozoon in enormous quantities.

The Club then adjourned.

ILLINOIS STATE MICROSCOPICAL SOCIETY.

The Illinois State Microscopical Society met on Friday evening, May 7th, 1869, Dr. W. W. Allport in the chair, Mr. H. F. Munroe, Secretary.

The By-Laws, as reported by the Committee at the last meeting, were adopted.

The following named gentlemen were elected officers:

President.—W. W. Allport, D.D.S.

Vice-Presidents.—Hosmer A. Johnson, M.D.; George F. Rumsey, M.D.; James V. Z. Blaney, M.D.; J. F. Beaty.

Treasurer.—George M. Higginson.

Secretary.—J. Hankey.

Secretary Foreign Correspondence.—S. A. Briggs.

Council.—S. A. Briggs, Joseph T. Ryerson, N. S. Davis, M.D.; J. Hankey, W. C. Hunt, M.D.; W. E. Doggett, J. H. Hollister, M.D.; J. F. Beaty, Walter Hay, M.D.; R. Ludlam, M.D.; Samuel J. Jones, M.D.; George M. Higginson.

Curator.—H. F. Munroe.

Librarian.—John Robson.

The President, in a neat speech, returned thanks, and pledged his devotion to the interests of the Society.

He then presented to the Society six slides of the *Trichina Spiralis*, received from J. H. McQuillen, M.D., of Philadelphia, as a donation to the museum. They were prepared from the muscle of a lady who died recently in Clay City, Ill., and were stained with carmine and beautifully mounted. These specimens were from a small portion of the biceps muscle forwarded by Dr. Allport to Dr. McQuillen. The trichinæ were exceedingly numerous, and evidently in a migratory state, as none of them had become encysted. Six other slides of botanical specimens and animal tissues were also presented by Mr. W. H. Walmsley, of Philadelphia. The thanks of the Society were voted to these gentlemen for their timely and valuable donations.

A large number of well-known citizens were elected members, and the meeting adjourned.

CHARLESTON DENTAL ASSOCIATION.

The Constitution of the above-named Dental Association has been received from the Secretary. The Society was organized in Charleston, South Carolina, December, 1867. The officers are:

President.—Dr. I. B. Patrick.

Vice-President.—Dr. W. S. Brown.

Secretary and Treasurer.—Dr. Theodore F. Chupein.

We are pleased to know of the existence of this society, and would be glad to have reports of its proceedings for the Dental Cosmos.

MERRIMACK VALLEY DENTAL ASSOCIATION.

The semi-annual meeting of this Association was held in Lowell on the 7th of May. Dr. Kidder, of Lawrence, in the chair.

The following delegates were chosen to attend the meeting of the American Dental Association, to be held at Saratoga Springs, the first Tuesday in August: Drs. Samuel Lawrence, G. A. Gerry, Chester Heath, Hiram Hill, A. P. Stevens, E. G. Cummings, J. W. Little, D. B. Ingalls, J. H. Kidder, W. M. Smith, W. H. Noyes.

Dr. Cummings, of Concord, N. H., read an essay on the "Spontaneous Abrasion of the Cutting Edges of the Teeth;" which subject was afterward discussed by Drs. Samuel Lawrence, Kidder, Fisk, Austin, and Little.

Dr. Perkins read a paper on the preservation of the teeth.

The subject of a base for artificial teeth next came in order for discussion: Dr. S. Lawrence explained his method of making aluminium plates; Dr. Kidder showed models, and explained his method of regulating teeth.

The subject of filling teeth after removal, and replacing the same, was discussed by Drs. Kidder, Shepard, Austin, Perkins, and others.

The Executive Committee reported the following subjects for discussion at the next meeting: "Regulating Teeth," "Filling Teeth and Roots," "Base for Dental Plates."

The following essayists were appointed: Drs. Thomas Palmer, of Fitchburg, and A. P. Stevens, of Portsmouth.

Adjourned to meet at Lawrence the first Thursday of November.

CHICAGO DENTAL COLLEGE.

The corporators of this institution held a meetin g on Tuesday, April 27th, 1869, accepted the charter, and elected the following named gentlemen as a Board of Trustees:

Hon. Thos. Drummond, Hon. John B. Rice, Hon. Francis Munson, Hon. E. B. McCagg, Rev. Robert Collyer, R. L. Rea, M.D., R. C. Hamill, M.D., Geo. H. Cushing, Samuel B. Noble, Geo. S. Bowen, Geo. Hibben, Horace White, A. N. Town, Lewis C. Ellsworth.

Upon organization of the board, the following officers were elected:

President.—E. B. McCagg.

Vice-President.—Robert Collyer.

Secretary.—Samuel B. Noble.

By-Laws were adopted, and a committee appointed on Faculty and Building.

Prof. Rea, of the Rush Medical College, then delivered a short address, advocating a thorough medical education for the dentist, and showing the necessity of an institute of the kind in the Northwest.

IOWA STATE DENTAL SOCIETY.

The seventh annual session will be held at Muscatine, Iowa, commencing Tuesday evening, July 20th, 1869, at 7 o'clock P.M., and continuing two whole days.

Subjects for Discussion: "Treatment of Exposed Dental Pulps," "Causes of Irregularity, and Best Mode of Treatment," "The Necessity of Legislation to Suppress Dental Quackery," "Anæsthetics in Dentistry," "Filling Teeth," "Mechanical Dentistry."

Any one having specimens of malformation, or cases of special interest to the profession, is requested to report the same.

Dentists from neighboring States are cordially invited to meet with us and take part in the discussion.

L. C. Ingersoll, *President.*

N. H. Tulloss, *Corresponding Secretary.*

THE STATE DENTAL SOCIETY OF PENNSYLVANIA.

THE annual meeting of this Society will be held in Harrisburg, at 10 A.M., on Tuesday, June 8th, 1869.

Members and delegates are requested to prepare essays.

THOS. C. STELLWAGEN, *Cor. Secretary*,
1627 Chestnut Street, Philadelphia.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Council of this Society has the pleasure of announcing that, through the liberality of the late President, Mr. Ibbetson, it is empowered to offer for competition a gold medal, value twenty guineas, for the best original essay on the following subject: "The Histological Structure of the Human Teeth."

The essay must be written in the English language, under a motto, and sent—with a *sealed* envelope, superscribed with the same motto, containing the author's name and address—to the President of the Society, 32 Soho Square, London, by the 31st of December, 1869, after which day no essay can be received.

The Council does not pledge itself to award the medal except for an essay of a certain standard of excellence, and will claim for the Society the right of publishing the successful essay in its "Transactions."

The scientific of all countries are invited to compete for this medal.

By order, JOHN DREW, C. J. FOX, } *Hon. Secretaries.*

EDITORIAL.

NO SECTIONALISM IN SCIENCE OR ART.

As an editor of a cosmopolitan journal, whose subscribers and contributors reside in every section of the globe where dentistry is practiced, and therefore aiming to be entirely free from all sectional bias, and devoted to the advancement and interests of the profession in every direction, exceptions were taken in the January number of the DENTAL COSMOS to the unfounded statement that sectional feeling had influenced the majority of the members of the American Dental Association. This communication, written in the kindest spirit, and merely in *defense* of an association in whose fair fame the writer feels a deep and abiding interest, has been made a subject of considerable comment during the past few months in two cotemporary magazines, and a degree of importance evidently has been attached to it and the writer, which was not anticipated when preparing the same. In my editorial it was distinctly stated that "the writer does not wish to be understood as taking

exception to the formation of a Southern Dental Society, but to the reasons assigned for forming one (*i.e.* sectional feeling), which, as has been shown, are unfounded. The right of members of the profession to organize societies whenever and wherever they please, is beyond a question of doubt, and the more there are the better for the profession and community. To secure success and perpetuity, however, such organizations should be formed upon a truly catholic basis, and with but one object—the advancement and elevation of the profession as a whole. When a body of professional men are to be brought together, however, with a view of scientific advancement, merely because they happen to agree upon religious or political questions, and holding aloof from all who may be supposed to differ on these points, the probability of such movements accomplishing much in the advancement of science is exceedingly doubtful."

Notwithstanding the fact that this communication was thus merely written in defense of the American Dental Association, it has been tortured into the most decided opposition to the formation of the proposed Southern Dental Association; this construction of it is entirely devoid of any foundation in truth. There is also a reiteration of the charge of sectional feeling, on the part of the members of the American Dental Association;—this, however, only has an existence in the imagination of the writers, for Northern members entertain none other than the kindest feelings toward their Southern brethren. And they have made this manifest by electing a number of Southern delegates to office, although the representation from that quarter has been exceedingly limited. Those of my fellow-practitioners in the South who have visited me, and many Southern students who have sat under my teachings, well know that they have always met with a cordial reception at my hands, and although entertaining decided convictions in relation to the right of all men to enjoy the fullest opportunity for the development of their physical, mental, and moral powers, my views have not been forced upon others, nor have differences of religious or political creeds been allowed to influence my professional or social relations.

It is a matter of regret to observe throughout these communications an avowed spirit of sectional feeling, in favor of Southern interests and institutions to the exclusion of Northern ones; manifesting in the most decided manner the very spirit charged against Northern men. In illustration of this it is only necessary to quote the following, from an address delivered by one of the writers:

"It is painfully evident that the late war has denationalized many of our interests, and that the homogeneous organizations of the *ante bellum* period must be succeeded by others that afford no matter for sectional rivalry and discussion. Aside from the reasons assigned above, other causes tend to give a sectional character to all organizations in this country; physical and climatic diversity, the various and opposite pur-

suits of the people (determined by necessity or taste), produce local centres of trade, education, and art. This condition of things is perhaps inevitable; if so we must suit our action thereto. If our grand object can be best secured by a Southern organization in which political and social congeniality will be an additional bond of brotherhood, let us act accordingly, with proper speed and directness, and thus give shape to our wishes. To my mind this course is inevitable. For similar reasons the South must educate her young men who are to enter our profession. The strife and bickering between our Northern dental colleges tend to prevent real progress, besides subjecting individual students to insult, revolting to self-respect and conscious rectitude. Our necessities do not justify the patronage of Northern institutions. The ability and zeal of Southern D.D.S.'s and M.D.'s are fully equal to any demand of education upon them—I say it with pride."

Without deigning to respond to the comments made relative to Northern institutions, it is to be sincerely hoped that this brief extract is not to be taken as the key-note of the basis and objects of the proposed Southern Dental Association, or of the sentiments of the dental profession in that region.

What a contrast is offered to the narrow tone of the above in the following, from an editorial by a Southern man on "Medical Teaching," presented in a recent number of the *New Orleans Journal of Medicine:*

"It may be that late disorders and legislation, growing out of the disturbance of our political equilibrium, have operated to the disadvantage of our medical schools, but we can assure our readers that no city* has been more orderly for the last three months, and that politics is no goddess of discord in our medical councils. To say more on this subject would only afford another example that 'grievous words stir up anger.'

"We would be distinctly understood as deprecating any appeal to sectional pride, or preference for, or reflection on those who do not choose to patronize home institutions. Aside from the *bad taste* and *questionable policy* of such a plea, our home medical schools have no need to invoke the *aid of the baser side of human nature to strengthen* their claim for patronage."

In these straightforward, manly words is presented not only evidence of the broad and liberal views of the man of science, but a true spirit of independence, which is willing to rest its claims to consideration and support on the merits of the institutions. Upon this basis alone can an enduring superstructure be erected, for all appeals to sectional pride in the long run prove unavailing, as they are but ephemeral and transitory in their influence, and particularly in a country like our own, where changes of the most marked and gigantic character are constantly occurring. It is reasonable to infer, indeed, before another quarter of a century, if not in the next decade, that the old

* New Orleans.

terms of North and South will have almost entirely disappeared, and through the influence of trade, from every quarter of the globe in its passage over that great artery, the Pacific Railroad, there will be substituted in place thereof the geographical distinctions of East and West.

The proposed Southern Dental Association, rising superior to sectional prejudice, should have for its sole object the advancement and elevation of the profession, and, dismissing all feelings of hostility to their Northern brethren, who have done them no wrong, its members, by concentrating their attention upon that alone, will have enough to occupy their time.

Institutions of learning should aim to be something more than merely local in their reputation and influence, and, above all, in place of fostering sectional feeling with a view of securing support, ought to frown down everything of the kind.

To young men who are entering the profession, the all-important question is where they can be best prepared for the faithful discharge of their duties, and secure the most thorough instruction in theory and the largest opportunity for the acquisition of a practical knowledge of their calling—*i.e.* obtain the most for their time and money. No sensible man would permit his prejudices to stand in the way when deciding such a question, and the faculties of colleges should meet the issue of success or failure on such a basis. There is something commendable in institutions rising above mere local influences, and becoming not merely national but cosmopolitan in their character, drawing to their halls students from every section of the country and every quarter of the globe, as the University of Leyden of old, and of Heidelberg and Göttingen in our own day. This cannot be effected, however, by appeals to sectional pride and prejudice, but through persistent and well-directed effort on the part of individual members of the faculties. J. H. McQ.

CORRESPONDENCE.

AMERICAN DENTAL ASSOCIATION.

To the Editor of the Dental Cosmos:

PERMIT me to call the attention of the delegates to and members of the American Dental Association, which holds its annual meeting at Saratoga on the first Tuesday in August, to the desire intimated and expressed by some, of making our next meeting additionally attractive and interesting by combining the social elements with our professional gathering; and to this end the Committee of Arrangements would suggest and urge the delegates and members to bring their wives and daughters with them, in the hopes that by so doing additional interest will cluster around our gathering, and add much to the pleasure and gratification of ourselves and those connected with us.

The Committee will see that accommodations are provided for all who will give timely notice of their wishes by addressing the Chairman, stating what accommodations they require, etc.

J. G. Ambler, *Chairman*,
25 *West* 23*d Street, New York.*

SELECTIONS.

EARLY HISTORY OF DENTISTRY.

BY J. BROCKWAY, SEN.

From an introductory lecture, entitled "Dentistry as it Was, as it Is, and as it Ought to Be," delivered before the Third District Dental Association of the State of New York, at their first meeting after organization, January 12, 1869, we make the following extracts, referring to the early history of dentistry:

"Gentlemen of the profession, all of you my juniors, and most of you by many years. It is my pleasure to congratulate you on the prospect that isolation, with all its repellant forces, is among the things that *were;* and fellowship, association, and mutual reliances, among the things that *are*, and shall remain as the foundation of our future increase in all that is lovely and of good report. And let us cherish the hope and the faith, that the transactions of this day may leave an impress, giving delightful promise, that unity of purpose, counsel, and action shall characterize the future.

"Within the half century of my practice, dentists have increased from a single score to ten thousand four hundred in the United States and Canadas. This is equal to a double every five years. The same ratio of increase for another half century would give us ten millions of dentists. But we may well suppose that in numbers, apportioned to population, we have reached, if not passed, our zenith. While we possess attainments and power for good, let us cherish the hope that we are but in the morning of our existence.

"The term dentistry is appropriately used to denote the business or the place of business. As a business, it includes both the science and the art of treating, preserving, and artificially substituting teeth. Dentistry is both a science and an art, while it evolves much that is purely mechanical. Science is the architect; mechanical art, the builder; science discovers the want and the means of supply; art attains the end. Science *pre*vails, art avails. Science, like 'charity, seeketh not her own, vaunteth not herself;' but art is fond of pecuniary reward. Hence the scientific are few, the artists many. Consulting ease of enunciation, we say, 'arts and sciences'; but in fact science occupies the foreground; art following, reaps the harvest. Science acquaints herself with the whole economy of animal teeth, with their matter and their manner; their origin and their end, with all their facts, in all their forms and in all their varieties, their connection with and adaptation to the varied modes of animal existence; and why properly formed teeth are unnecessary to some forms of existence, and indispensable to others; why wanting in reptiles, creeping things, and flying fowl; why the higher order of animals scarcely subsist without them; why, with many, the duration of the teeth is the measure of their existence.

"Science would know why the infinite variety of form and size, from the thistly jaw of the smaller aquatics, to the movable envenomed fang of the serpent, up to the powerful war weapon of the tiger, the lion, the bear, the whale, and the mastodon; and why the peculiarity in number, in structure, and form of the human teeth; why both deciduous and permanent; why come in the time and order they do; why partly vital and partly not; why incapable of extension and growth and of repairing their fractures or abrasions; why subject to decomposition and rottenness; why the medium of so much pain; and what are remedies for their diseases. Science, too, must understand the chemical, as well as vital, organism of the teeth; the matter and the manner of their composition and formation, the arteries, veins, and nerves, and all the ramifying capillaries, and nerve-fibrils, as well as the corpuscles, tissues, and granules that enter into their composition and organism. Science would understand the entire functions of the teeth and the means of securing them in their normal condition and appropriate use.

"Mechanical dentistry, as such, has little or nothing to do with the animal economy; but, as an art, dentistry seeks the hand of science, and by her would be led and guided. It would supply the artificial remedies and mechanical appliances agreeably to the teachings of science; adopt and adjust all her fixtures and mechanical powers and agents; remove all obstructions to the health of teeth, and supply losses in accordance with the laws of nature as discovered by science.

"The dentistry of the operating chair is no less mechanical, though more artistic, than that of the laboratory. Indeed, mechanical skill and artistic display make their happiest efforts in perfecting the form and external condition of the natural teeth. While some operations are more *strictly surgical*, the whole class of operations of the dentist, when performed in accordance with scientific principles, deserve as they have received the apellation of dental surgery.

"Both the dental science and art are of European birth, but of American growth. It was not until the latter part of the eighteenth century that France began her survey of this hitherto uncultivated field. It was in Paris, the source of scientific inceptions as well as fashion, that dentistry was conceived. It was cradled in England, while it required the atmosphere, the soil and the culture of America to mature it.

"High on the catalogue of American pioneer dentists will be written, in unfading colors, the name of PARMLY. Two Vermont families have given our profession one for each day of the week. But Eleazar, whose professional days are numbered, stands in the eye of the public as did the father-in-law of David, a head and shoulders above his brethren. As he has favored me with a few items of his own and his family history he shall speak for himself:

"'I commenced practice in Montreal in the spring of the year 1815, with my brother Levi Spear Parmly, one of the pioneers of the profession in this country, who was one of the first of his day and a very remarkable man. He had the advantage previously of the instruction of Dr. Petrie and Dr. Randall, of Boston. The latter, with Dr. Greenwood, had the control of the practice in Boston. Messrs. Parkhurst, Wooffendale, Gaeten and Greenwood had all that was worth having in New York. Philadelphia was more fortunate, having Gardette, Hudson, and Koecker, all of whom in that day were remarkably clever men;

The two first having the advantage of being educated to the profession; the second being the son of a distinguished dentist in Dublin, Ireland. Hayden, of Baltimore, was an exceedingly clever man, being a mineralogist as well as dentist.

"'In 1817, I met with a young gentleman by the name of Shymanski—gentlemanly in every respect—who had studied and practiced dentistry in Poland as they understood it there.

"'These were the principal dentists of that day.

"'I met with no other person who even called himself dentist, from Philadelphia to New Orleans, and I practiced in the principal towns going west between the two places; but feeling my total want of a knowledge of the profession, I then went to Europe to study, where I became thoroughly acquainted with silicious teeth. On my return to New York, in 1822, my brother, Levi S. Parmly, settled in New Orleans; my brother Jehial going south during the winter My brother Samuel settled in New York. My cousins Jehial and David are still in New York; their brother Ludolph settled and died in Mobile.

"'I have already given you the names of the principal men of 1815, and now at seventy-one I have seen the profession grow from an art to a science, with societies, colleges, and schools, where little else is taught, and the number of dentists beyond counting; and of this number, a few have been successful, but the greater number have lived along as you see them now.'

"Dr. Eleazar Parmly, for some eight years after his return from Europe, and up to about 1830, sought his pleasure and his profit in occasional itinerant practice. Troy was among the places visited by him.

"So early as 1810, an elder brother of mine, Wm. Wolston Brockway, went from Newbury, Vt., near the birthplace of the Parmlys, and entered into the practice of dentistry in the city of Boston. In about one year death ended a prosperous and prospective business. I inherited his instruments, and ultimately his profession, although I did but little until 1822. But at that time I was about the only dentist *known* from Canada to Albany, and from the Rocky to the White Mountains. I knew of but one other who visited that territory anterior to 1822, and that was a Dr. Lyscomb, educated to medicine, from whom I received some instructions.

"The little State of Vermont, whose population was less than three hundred thousand, supplied more of the early dentists than all the other States. Seven Parmlys, two Brockways, Fitch, Brewster, and Davidson, who itinerated in Vermont. Of the three first dentists of Philadelphia, I think neither were of American birth, and but two of the New York and two of the Boston pioneers.

"The dentists who occupied the field during the first quarter of the century gave a better *average* of educated training and capacity than those of the present. Hudson, as a practical operator, has no superior at this day, having been educated by his father, the best dentist in Dublin, Ireland. Gardette, too, was a European and well educated. And Koecker, as every one who has read his *Practice* will admit, was not behind the best of his day; while Hayden, of Baltimore, was an educated and scientific practitioner. The New York and Boston dentists were but little behind them. Randall and Greenwood gave character to the profession in Boston. And Greenwood, of New York, immortalized his name by an entire set of teeth for the greatest and best—Geo.

Washington; he extracted and wore, as a watch seal, his last tooth. And Dr. Parmly yields to Wooffendale, of New York, the credit of introducing, in this country, the use of gold foil, for plugging teeth. I had supposed it to be due to Hudson. But the gold foil of 1830 and 1840 was, as a whole, superior to that made since. That manufactured by the elder Kearsing was not less cohesive than the best now made. Fitch, of Vermont, was the first American writer on the teeth who ventured upon a large royal octavo volume. And Brewster, after having attained some notoriety in this country, obtained royal favor in France, and a knighthood from the Emperor of Russia.

"The junior as well as senior class of dentists was largely from the North and East. Of these, six were students of mine. I will name them in the order of seniority: First, Bigelow, who opened the practice in Buffalo, and was successful. Second, Blakely, who settled in Utica, and sustained a good reputation. Third, Clute, the first located in Louisville, and the first in Kentucky; as a plugger he has had few equals. Fourth, Robert Nelson, who, in a double sense, was first, permanently located on North Pearl Street, Albany. Fifth, Williams, who settled in New York City, but since left the profession. He, together with Bigelow, Blakely, and Nelson, sleep with the fathers.

"Clute survives, but has retired with money, reputation, and gray hairs. My sixth was my son, Wm. W., whose practice in the city and country has been successful. Besides the above, Gedney left Albany for England about 1827, acquired a fortune and returned; he is now in this vicinity. Dr. Young, whom it will do to call our venerable president, commenced practice in Troy, in 1829, where he has remained a valuable fixture. Douglass was, for years, the only dentist in Albany; his first colleagues were Cuyler and Nelson. And now, in 1869, their successors number fifteen. My place in Vermont was first supplied by Read and Stratton, both of whom are long since dead. Vermont, with little increase of population, now supports about sixty respectable dentists. Of the junior class to which I have referred, were four of the Parmlys; and of the sixteen I have named as my Northern successors, seven only survive, and of the seven but three remain in practice. From 1826 to 1829, I was alone in the practice in Troy, leaving it in 1839 to be supplied by a respectable corps of twelve in 1868. It has been my pleasure and privilege partially to fit and send into the field eighteen young men, who nearly all have profited by a profession and a religion which honors all who honor them. I stand before you to-day, broken, though little bent, under the weight of threescore and fourteen years, the oldest of any one now in practice in the United States.

"I have now briefly sketched the history of nearly all the first class of dentists in the United States, and given the names, with little comment, of sixteen Northern successors, who, I think, were all in the field in 1832. Of these two generations but eight survive, and but four remain in practice. Two generations of dentists have come and gone, since my elder brother, W. W. Brockway, a very remarkable young man, learned and talented, operated in our American Athens, the city of Boston. As with every enduring edifice, so with dentistry; its foundation was laid by skillful hands. England to-day, with her increase of material, can scarcely supply a match for Hunter, and Fox, and Bell.

"We are not quite in the position of the Jews when the second tem-

ple was built. Their young men *shouted*, and their old men *wept*. The glory of Solomon was not there. But I have seen myself many of Hudson's plugs, after a service of thirty years, as clean and as clear as the very best specimens of this day.* Drs. Parmly and Clute bear the same testimony. Surgical dentistry may have advanced in some particulars, and possibly as a whole, but it has no demonstrator to take the crown from the head of Hudson.

"Nor is it singular. The architect is always greater than the builder, and the builder greater than the workmen. The corner-stones of nations, religions, professions and arts have always been laid by strong hands, and on shoulders *par oneri*. Judaism had an Abraham, and Christianity a greater; the Jewish state a Moses, and Egypt her Pharaohs; Media and Persia her Cyrus and Darius; Macedon her Philip and his son; Rome her Romulus and Cæsars; modern France her Napoleon; Russia her Peter, and America a greater and a better, our Washington. Demonstrative sciences and literature, in England and America, were swaddled by a Locke, a Bacon, a Newton, and a Franklin. The Protestant faith glories in her Luther and Calvin, and Reformation in her Wesley and Whitefield, and American theology in her Edwards and Dwight, while the law delights in one Story, and medicine in her Rush. And as early demonstrators of American skill in the dental art, the names of Hudson and Hayden will always stand at the head. The force that removes the inertia of a ball, a pendulum, or locomotive, will, if continued, accelerate their motion. We needed none greater or better than our founders in France, in England, and America, to carry our art to its culminating point.

"But this leads me to call your attention to the opposing forces which had to be met and overcome by the founders of dental art and science; and

"1st. It was opposed by the history of the world. For nearly six thousand years, and two hundred generations, the nations had lived and flourished without dentistry,—why not follow the footprints of the fathers? The molar teeth of the antediluvians for sixteen centuries served them as their only and sufficient flouring mills. And from Egypt, entire sets of sound teeth, that have served the octogenarian, have come down to us grinning in mummies embalmed three thousand years ago. And in the days of Solomon, the teeth of his spouse were likened to arches of ivory, and, still more poetically, to a flock of sheep coming up clean from the washing, whereof every one beareth twins. They were well without dentists, why not we?

"2d. Science and the arts, with instincts long petrified, would have it that teeth were the better the more they were left alone.

"3d. Superstition cried loudly, protesting against all attempts at frustrating the plans of Him who takes but what He gives. It were wickedness to attempt to restore what God has taken away.

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* "Scarce a month now passes but my attention is called to teeth, with plugs in good order that I put in thirty and thirty-five years ago. In 1823 I plugged a molar tooth with tin foil for Rev. Dr. Merrill, of Vermont. He died about ten years since, with that plug and tooth remaining, the sole representative of an entire sound set thirty-six years before. During the first decade of my practice I think I averaged ten plugs a day of tin foil. In cases exposed to wear by mastication, tin foil wears concave; otherwise it preserves the teeth equal to gold, and for most cases is preferable to amalgam; but no dark plug should ever be used in the incisor teeth."

"4th. And ignorance, always clamorous, was loud in asserting the utter worthlessness of all dental help, save the relentless hawk's bill and turnkey. Having got her key-note from science, she could raise and fall a dozen octaves. A concern, equaled only by ignorance, for the tooth's enamel, induced a horror of tooth-brushes and dental instruments. Above all things, their swollen gums must be saved from the touch of a brush, lest fatal bleeding should follow. Such were some of the prejudices of education and habit.

"But another class of difficulties was found in the absence of tried and approved instruments and appliances for proper treatment. And here art was slower than science. The disease was seen and understood, the remedy indicated, but the means and the manner of treatment were yet in abeyance. But Hunter and Fox, and their colaborers, applied themselves diligently to the work. Their first effort was to seek the *cause*, and then the remedy. But in the mean time the difficulty, as it already existed, called for treatment. They soon learned that the removal of extraneous matter from the teeth, and *excess of blood* from the gums, must be effected; and to this end they summoned to their aid the tooth-brush, the astringent, and the alkali, as well as the scaler, the excavator, and the plug; but last and least, artificial substitutes for the teeth. But the necessary instruments and agencies were to be invented and proved, before there could be progress.

"The desirableness being admitted, the practical method of supplying artificial teeth was long in abeyance. The first method, practiced only in a few cases, was transplanting from the heads of the poor to the rich; this soon lost all favor, as by it disease was sometimes transplanted. This practice was succeeded by *pivot teeth*, and blocks of sea-horse teeth attached, first by silken and afterward by gold ligatures; these were succeeded by clasps. Entire sets were very rare, but were set upon ivory base, with sea-horse, animal, or human teeth. These were held to the jaws first by plain and afterward by spiral springs. The use of impression cups, and of plaster of Paris and swages, was unknown to our early dentists. From 1824 to 1828, I occasionally got up teeth on gold plates, raised and fitted to the mouth with a hammer and pliers. I never saw or heard of a swaged gold plate till about 1830. Mineral teeth were used occasionally in France and England as early as 1810, but I never saw one till 1829, when I inserted the first two for Philip Dorlan, Esq., of Troy, which I believe remain to this day. They were a coarse clay half-tooth with platina clasps baked in, to which I soldered a gold pivot, and having filled the pivot hole, in the root, with red cedar, and pressed a small instrument into its centre, shoved up the artificial crown; the roots, with the teeth attached, remained unmoved the last time I saw Mr. Dorlan. This is, doubtless, the best method ever adopted for setting pivot teeth."

HOW CHLOROFORM ACTS.

BY CHARLES KIDD, M.D.

"It is curious, but interesting, and not without suggestiveness to the calm observer of medical science, that it is to the half despised branch of dentistry that we owe, not only the grand glory of anæsthetics, but many subsequent improvements in that art. All our Latin Harvæian orations, all our severe logic,—so called,—all the solemn benedictions

sanctioned by Esculapian wand and gold mace in these our later days, helped by the severe exclusiveness or orthodoxy of quarterlies, etc., has only helped to smother or destroy the two grandest facts in all medicine.

"Chloroform, like vaccination, as half predicted by Lord Bacon himself, has come on the world despised and rejected at first by the severe dignity of colleges; the name of Morton or Wells is unknown to the younger members of the profession, and Jenner's monument is put in a dust-heap in Kensington Gardens, as he so disliked, and was so horrified by, the treatment he received at the colleges. The nitrogen protoxide may be a most valuable agent as an anæsthetic, but only for the Dental Hospital we should have known very little about it.

"The 'deficient oxidation' theory of the action of chloroform has filled various pages of the *Journal.* It appears to Dr. George Johnson, Dr. Sansom, and Mr. Clover, rather a stone of stumbling or rock of offense—oxidation as contradistinguished from vital or nervous action. But the cause of the confusion is not far to seek. It so happens that some active logic is at work in some hard hitting of late between Mr. Huxley and Professor Lionel Beale on this point, as to whether the life, for instance, in a gnat or flea is but chemical oxidation and nothing else. Roast mutton, it is contended by Mr. Huxley, is changed physically into human thought, nerve force, and the power of æsthetic association in the brain of man! Dr. Lionel Beale disbelieves Huxley's dogma; and so we will go on in reasoning about the exact vital or oxidation theory of anæsthesia according as men side with one school or the other.

"If I write these few lines it is to say that I offered a paper at Oxford to show that the 'deficient oxidation' idea of Snow is probably only *part* of the truth. We cannot explain by it how nitrous oxide acts so remarkably as an anæsthetic. The late Dr. Graves used to remark that the pride of sects in medicine did immense mischief; and even as to the nature of typhus fever he could always see the liberals in politics always adopted one view of life and organization, treatment of typhus, advice as to quarantine, etc.; but men educated differently in politics, also gave their adhesion to an opposite view of life and organization, etc.

"I believe chloroform acts as a vapor in the blood, on the protagon or nervous matter, directly impeding, for the moment, the molecular changes or vital influence that give rise to sensation, etc. There is something behind and deeper than mere deficient oxidation. We cannot believe the opinion that it acts in relieving pain by mere deficient oxidation. We cannot satisfy the logical mind by saying, 'when I use a muscle there is rust or waste, as iron would rust.' May it not be that oxidation runs parallel with vital action? Life is continuous from one animal to another, as magnetism is in two pieces of iron.

"If the deficient oxidation theory alone were true, with the necessity for measured percentage of chloroform in a balloon apparatus, and death from syncope from absence of oxygen, the other corollary from the oxidation idea—then nobody would give chloroform at all. I have seen chloroform given, and have myself given it now in many thousand cases. I have never seen a death from it, though I may have prevented accident at the moment in a dozen cases at least; but I must say everything I have seen of chloroform convinces me that Dr. George Johnson and the cardiac syncope school are in error."—*British Journal of Dental Science.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

"*Artificial Teeth Dislodged and Swallowed, or Impacted in the Pharynx.* Cases by George Pollock, F.R.C.S., Surgeon to St. George's Hospital.—The accidental and sudden dislodgment of an artificial tooth-plate from its proper bed, and the subsequent misfortune of such a mass falling into the pharynx, is by no means a very rare occurrence. It is always an event of sufficient interest to the practitioner; sometimes one of imminent danger to the patient; occasionally, though more rarely, immediately fatal in its results. For these reasons, I have thought the notes of the following cases, with some general remarks on the results and treatment of such accidents, may be worthy of record.

"CASE 1.—A lady, while attempting to swallow some pills, dislodged her artificial teeth, fixed to a small gold plate. The teeth consisted merely of the two central incisors. She had used the plate for some time, and it was rather the worse for wear, and fitted loosely. The mass dropped into the pharynx as soon as it became dislodged. The patient almost immediately felt pain 'down the throat,' and shortly afterward, on attempting to take food, experienced difficulty in swallowing it; the greater portion of it returned almost as soon as swallowed. It was evident that the rejected food had not passed into the stomach. The pain was referred to the median line, rather low down in the chest, and to a point above the epigastrium; it was fixed and persistent, sometimes sharp, and always increased on any attempt to take solid food or fluid.

"She was very soon seen by Mr. J. Blackstone, of Gloucester Place, Regent's Park, who prudently watched the case for some days; nor did he make any attempt to interfere with instruments, as the plate was evidently out of the reach of forceps. Finding, however, that the pain continued, and that there was not only difficulty in taking nourishment, but that it was chiefly obliged to be taken in a fluid form, and always with great aggravation of pain, he requested me to see the patient. This was on the tenth day after the accident. There was still much discomfort, and an inability to swallow food without pain; it could only be taken in small quantities, and that chiefly in the fluid form. The pain was described to be low down in the median line, and referred to a spot corresponding to the lower extremity of the œsophagus.

"At our request the patient made an attempt to swallow a little fluid in our presence, when it became quite evident that some positive partial obstruction existed in the œsophagus. The fluid was taken with caution, in small quantities, and slowly, otherwise a sensation of choking was produced; nor did the small quantity pass into the stomach as freely as it should have done.

"No attempt was made on this occasion to pass any instrument. As the pain was referred to so low a position, it was considered just possible that, as the foreign body was probably far down, solid food persistently taken might propel the mass into the stomach. The patient was therefore recommended to try the effect of swallowing large pellets of well-masticated bread; with the hope that, if the œsophagus could

thus be slightly distended, the foreign body might be pushed into the stomach by the food. Another reason for avoiding instrumental interference was, that the plate was described to be rough at its edges, with one or two sharp points projecting therefrom. It was considered that, with such a mass, fixed by sharp points to the walls of the œsophagus, forcible attempts to push it onward might probably be followed by serious mischief. It was therefore decided to wait a few days longer, with rather a forlorn hope that some favorable change in the position of the foreign body might take place; all aperient medicine to be avoided in the mean time.

"On the 4th of January the local symptoms were unchanged, but the patient was evidently thinner and weaker, for she had not been able to take much solid food since the day of the accident. She was also very anxious about herself, and was becoming very nervous and desponding. An œsophagus tube was now passed very slowly and gently through the mouth and pharynx into the œsophagus: when more than half way down, and near the cardiac orifice, the extremity of the instrument came in contact with some solid resisting body. With very slight, continued pressure the latter appeared to be almost immediately dislodged, and the end of the tube then readily passed into the stomach; nor was anything felt to rub against it or resist it on its withdrawal. The patient immediately expressed herself relieved from the pain, and was now able to swallow solids and liquids without difficulty.

"In a few days, however, this lady again began to complain of pain, but it was now at a different spot. The pain was referred more to the right side, and somewhat lower than before—apparently about the neighborhood of the pyloric extremity of the stomach.

"This new symptom persisted more or less without relief, and without alteration of position; but the patient was able to take food, and she generally improved in condition. The treatment laid down was, to avoid aperient medicine, and to attend generally to the state of the health.

"Thus the patient continued, without any perceptible alteration, until the 11th of April. On that day she had been ordered to take two pills. While in the act of swallowing them she vomited, and brought up a quantity of fluid from the stomach. In the act of vomiting she heard something strike against the basin, and on more carefully examining the contents, found, to her great delight, that she had brought up the artificial teeth and plate, as perfect and as bright in condition as on the day the mass had been swallowed.

"This foreign body was nineteen days in the œsophagus, was then dislodged, and remained ninety-seven days in the stomach.

"Fig. 1 is an accurate representation of the artificial teeth and plate.* The longest diameter is three-quarters of an inch across from point to point.

"It will, however, be hereafter shown, that when once a foreign body is introduced into the pharynx, its *shape* is, to some extent, of more importance than its *size*. Its easy and safe progress onward through the alimentary canal will greatly depend on the former.

"Case 2.—Fig. 2* is an exact representation of some artificial teeth and gold plate swallowed by a lady while at her dinner. For the notes of

* Omitted.

the case I am indebted to my friend Mr. Theophilus Taylor, of Ebury Street.

"'I was called,' he says, 'to see Mrs. —— between two and three o'clock P.M. on February 25th, and was told by her husband that, while taking some soup a few minutes before, she had swallowed her set of artificial teeth, consisting of six teeth set in a gold plate for the upper jaw. She complained of a burning sensation at the epigastric region, but of no other distress; and she could then swallow easily. I advised her to take castor oil, and to live on farinaceous diet.

"'I saw her the next day, when she expressed herself as "quite comfortable, and not at all inconvenienced." The bowels acted freely from the oil that day and the next. On the morning of February 28th, at 8 A.M., she had a "bearing-down" feeling in the rectum and urgent desire to go to stool, and presently the teeth passed, as complete as they had been swallowed three days before. The mass was enveloped in thick mucus when first examined. The patient is perfectly well, and has not had any unfavorable symptoms since.'

"The extreme diameter of this plate (Fig. 2) is $1\frac{3}{4}$ in. Although considerably larger than the tooth-plate Fig. 1, it has no sharp or projecting points; its entire margin is comparatively smooth.

"CASE 3.—The dislodgment of the tooth-plate in this case proved immediately fatal. It became fixed in the pharynx, and so pressed on the epiglottis as to produce entire closure of the glottis.

"W. M——, aged twenty-four, was brought in dead to St. George's Hospital on August 16th, 1862. He was stated to have been running, when he stumbled and fell to the ground. As he did not rise, he was supposed to be in a fit, and was conveyed to the hospital. When admitted he was quite dead. The cause of death was unsuspected.

"On post-mortem examination, the lungs were found congested, but all the other viscera healthy. When the finger was passed into the pharynx, in order to take out the adjoining structures, an irregular, hard mass was felt lying upon the epiglottis. This proved to be three false teeth, fixed upon a metal plate, having a sharp prominent hook at each end to grasp some teeth in the upper jaw. The false teeth lay in the pharynx, but were loose and unattached in that position. There was no mark of injury upon the surrounding mucous membrane.

"No measurement is preserved of this plate, as the friends of the man would not allow it to be left at the hospital. There can be no doubt that, in this case, the plate became dislodged, fixed by its sharp points in the pharynx, and, pressing on the glottis, produced immediate suffocation.

"I must next refer to a case reported by Mr. Paget.* An old gentleman, while lying down faint, or perhaps in the beginning of a slight epileptic seizure, asked a servant to take out for him his artificial teeth—nearly complete separate sets for the upper and lower jaws. The servant, he believed, took them out. Of what immediately followed, he could remember nothing more than that he became more ill, with difficulty of breathing, and a sense of choking and suffocation; in which state he sent for medical help. He was found suffering with much difficulty of swallowing, and some dyspnœa. When one set of his teeth was missed, his medical attendants, who suspected that they might

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* British Journal of Dental Science, vol. v. p. 337.

have been swallowed, were begged not to speak of them to him, for fear of exciting him.

"The severity of the symptoms subsided in a few days; and beyond slight inflammation of the fauces, nothing morbid could be seen in his throat. He had considerable and increasing difficulty in swallowing, was obliged to drink very slowly, and to cut all his solid food into very small fragments. Sometimes he was almost choked by food, and occasionally he vomited after taking it.

"Mr. Paget saw the patient four months after the accident. He says: 'On examining the mouth and fauces I could see nothing unnatural, till, on extremely depressing the back of the tongue, I saw something white near the edge of the epiglottis, but too obscurely to guess what it was. Passing my finger to the side of the epiglottis, I felt teeth there, and soon hooked out the whole lost set.' This consisted of a large plate, with nine false teeth attached, and with spaces for three natural teeth to fit into the edge. The interesting point in this case is, that so large a mass could be lodged in the pharynx without pressing on the glottis, and, as in the former case, producing immediate suffocation; or, on the other hand, effectually preventing the passage of food, as happened in two cases recorded by Mr. Cock, of Guy's Hospital, and referred to hereafter. This plate is by far the largest I have met with on record as having been dislodged, then impacted in the pharynx, and subsequently removed without an external opening. It measured $2\frac{1}{4}$ in. in its antero-posterior diameter, and $1\frac{5}{8}$ in. across.

"Mr. Cock has recorded, in 'Guy's Hospital Reports' (vol. iv., third series, p. 217), two cases, in both of which he had to perform pharyngotomy in order to remove artificial teeth impacted in the pharynx. In the first case, the length of the plate was $1\frac{5}{8}$ inch, and its breadth one inch. One extremity terminated 'in a slender clamp, with two points as fine as needles; while the other extremity formed a single sharp point. From the anterior edge a false tooth projected.' This plate was swallowed on the 17th January, and stuck at the lower part of the pharynx, opposite the cricoid cartilage. The patient was unable to swallow any food or fluid, but Mr. Cock succeeded in passing a catheter by the side of the plate, and through it was able to introduce fluid food into the stomach. All efforts to withdraw the foreign body by instruments through the mouth having failed, Mr. Cock opened the pharynx on the left side of the neck, and most successfully removed the mass. The patient was perfectly relieved, and recovered most satisfactorily. The shape of the plate is accurately represented by a drawing in the volume referred to, and most satisfactorily accounts for its impaction in the pharynx. At its lower extremity the sharp points of the gold plate became impacted in the soft walls, which closed in upon the foreign body, and effectually stayed its further descent.

"It will be observed that this metallic plate is less at its greatest diameter than that which is represented by Fig. 2. But from the circumstance of its being armed by three sharp projecting processes at its extremities, it was caught by the walls of the pharynx; while the smooth-edged, though larger, plate passed into the stomach without difficulty, and with but momentary discomfort to the patient.

"The second case, recorded by Mr. Cock, is of a somewhat similar nature (Guy's Hospital Reports, vol. xiii., third series, page 1).

"A man was in the habit of wearing a silver plate, on which six or

seven teeth had been formerly fastened; but, though the teeth had fallen away, he continued to wear it to keep his mouth in shape. He wore the plate in bed, and one night he woke up choking, the plate having slipped into the pharynx while he was asleep. The mass was felt lying below the level of the cricoid cartilage, and attempts were made unsuccessfully to remove it through the mouth. After several such attempts the patient objected to further interference, and placed himself under the care of Mr. Cock. The breathing was then unaffected, nor was there any constitutional disturbance, nor any other symptom than that of a little local inconvenience aggravated by attempts to swallow. He had taken no food for seventy hours; for whenever he attempted to swallow anything, solid or liquid, it returned. A large, flexible catheter was passed by the side of the plate down the œsophagus, and through it the patient was fed. Mr. Cock, finding there was no prospect of moving the plate without opening the pharynx, operated upon the man four days after the mass had been swallowed. The plate was removed successfully, and the patient recovered most satisfactorily. The mass consisted merely of the metallic portion of the artificial structure; but had projecting from its edges six points, or sharp wires, on each of which a tooth had formerly been fixed; and also from one end there projected two sharp arms, which had embraced a tooth or stump. This plate is represented by a drawing in the volume referred to. Its shape and sharp projections entirely explain the cause of its arrest in the pharynx. Its longest diameter is less than that of the plate represented by Fig. 2. Like the first case related by Mr. Cock, its shape rather than its size interfered with its passage down the œsophagus. It measured $1\frac{1}{16}$ inch in its longest diameter.

"The results of the cases related prove that the *shape* of a foreign body, once introduced into the pharynx, is of much more importance than its size, within certain limits; and that its arrest, or more or less free progress through the alimentary canal, will depend in a very great measure upon the former.

"In confirmation of this statement, I may here relate the results of some experiments I made, with the assistance of Mr. Pick, curator of St. George's Hospital museum, to test the capacity of the pyloric orifice and the ileo-cæcal valve to transmit foreign substances introduced into the stomach.

"The stomach was removed from the dead body with the duodenum attached; and the cardiac half was cut off. The pyloric half was then held up and open, the pyloric orifice and duodenum being dependent. A half-crown piece was dropped into this portion of the stomach; with a little shaking, it passed through the pylorus, and dropped out, through the duodenum, into a basin below. The artificial tooth-plate, represented by Fig. 2, was then dropped into the same portion of the stomach, held up in a similar manner. With very little shaking, it soon slipped through the pyloric orifice and duodenum. The tooth-plate, represented by Fig. 1, was then dropped into the suspended portion of the stomach. The prominent tooth at once fell into the pyloric orifice; but the points at the extremities of the tooth-plate hooked on to the sides of the valve, and no shaking or manipulation, *without force*, would have succeeded in getting it through the orifice and duodenum.

"Similar experiments were then made, with these three substances, with the ileo-cæcal valve, and with precisely similar results. The half-

crown piece, and plate, Fig. 2, slipped through readily; plate, Fig. 1, hung in the opening. So that it was clearly evident that the sharp, projecting points of the latter alone stopped its progress from the stomach into the duodenum, or from the ileum into the caput coli.

"No doubt the plate, represented by Fig. 1, during the time it remained in the stomach, stuck, as we saw it in this experiment, at the pyloric orifice, and was the cause of the pain the patient complained of after it had entered the stomach.

"The plate, Fig. 2, is longer in its diameter than either of those referred to by Mr. Cock; but the results of the corresponding cases are materially different. The smooth-edged plate, but the largest, passed through the whole alimentary canal, without any great inconvenience to the patient, in three days; while the other two, with sharp projecting points, were at once impacted in the pharynx, and could only be removed through an external opening.

"It thus appears that even a small tooth-plate with sharp points, or rough edges, is not likely to pass beyond the stomach, even should it get so far; while a larger one, with smooth edges, may pass through the alimentary canal without much discomfort. A large plate, with sharp points at its edges, cannot pass beyond the pharynx, and when once there cannot readily be removed, without the pharynx is opened externally. But a large plate, with smooth edges, having passed into the pharynx, though it cannot get beyond that point, may be withdrawn through the mouth, and does not necessarily involve a more serious operation.

"A few remarks on the treatment in such accidents as the above may not be misplaced here. Mr. Cock has very truly observed (Guy's Hospital Reports, vol. iv., third series, p. 217) that, 'as the use and application of artificial teeth daily increase, and as many of them are imperfectly fitted and carelessly worn, there can be no doubt that the casualty (of their being dislodged) will recur again and again.'

"If the foreign body be lodged in the *pharynx*, and there be sharp points projecting from the edge, no effort on the part of the surgeon will succeed in pushing it downward. Nor should any such attempt be thought of. It is either retained there by its size, as in Mr. Paget's case, or by its shape and sharp points, as in the cases recorded by Mr. Cock, and as occurred in that of the man who died suffocated.

"When satisfied that the mass is in the pharynx, the surgeon should attempt first to remove it through the mouth, and with one or two pairs of strong and long-curved forceps he may succeed possibly in doing so. But if these attempts fail after a few times, they should not be persevered in. Violent or oft-repeated trials to extract it will only be followed by local irritation, and might even produce more serious mischief.

"When, therefore, gentle means have failed to relieve the pharynx of the foreign body, and the patient has continued difficulty in taking food, œsophagotomy should be had recourse to without delay. Let us suppose such another case as that in which the plate, Fig. 1, was swallowed, and that the foreign body had entered the œsophagus, and there remained and interferred with the passage of food. It would of course be best to attempt by gentle means to push it into the stomach. Should pain then commence, and there be no evidence of the further passage of the foreign body, with my present experience I am inclined to recommend that a gentle emetic should be given on a full stomach. In all

probability the mass would be returned with the ejected contents. The results of the experiments made with the stomach and intestine, and described above, prove that there would be no prospect of such a shaped mass passing the pyloric orifice; nor can we suppose it would remain an indefinite time in the stomach without danger to the integrity of its walls.

"As regards general treatment, I am of opinion that we cannot be too particular in abstaining from aperient medicine when foreign bodies have once passed into the stomach. It stands to reason that, if a foreign substance is to pass through the alimentary canal at all, the more solid the contents, the greater will be the facility, if not rapidity, with which it will pass—especially when once in the lower bowel, for it there becomes surrounded and protected by solid fæcal matter; whereas, if the contents of the bowels be entirely liquid, the foreign body may become more or less impeded in its exit by the walls of the bowel contracting on it

"Practical experience has established this kind of treatment as a rule among those who make their living by passing false coin. When detected by the police, they swallow whatever bad money they may have about them; and under such circumstances, if they escape, they invariably avoid purgative medicine, and live on a constipating diet, until the coin has been passed. 'Cheese and hard-boiled eggs' are the principal ingredients of their fare.

"This practical experience is not to be treated with indifference, however questionable may be the respectability of the practitioners who adopt it. It points to the rational practice, that when a solid, hard substance is once swallowed and passes into the intestines, we should not render the contents of the latter more fluid than natural by the administration of purgatives, but rather recommend such food to be taken as would be likely to produce a slight degree of constipation, so that the foreign body may be enveloped in the solid contents of the bowel, and its escape thus rendered more certain and easy.

"In conclusion, we may caution those who are compelled to wear false teeth that they should never go to bed with them in the mouth, as they are apt to become dislodged during sleep; and if the plate be in any degree loose, or readily displaced, to have the defect at once made good, rather than run the risk of any accident from their becoming suddenly dislodged."—(*The Lancet.*)

Section of Superior Maxillary Nerve for Neuralgia. By Dr. James E. Garretson. (*Med. and Surg. Reporter.*)—"In this case the patient, a lady, wife of an undertaker, residing on West Market Street, had been suffering with periodic attacks of pain about the head and face. This patient, exceedingly quiet and retiring, spent most of her life in sunless rooms, surrounded by the melancholy paraphernalia pertaining to her husband's business; she was anæmic, and of poor general health and spirits. Although this patient had certain bad teeth, yet the pain had never seemed associated with them; indeed, so insensible were these organs to ordinary agents of irritation, that a diagnosis had been founded alone on her general condition and surroundings, and remedies applied entirely in such direction. Tonics were administered, windows unbowed, exercise and amusements, conjoined with generous living, were advised, but with even this entire change the patient failed to im-

prove, but on the contrary grew constantly worse. The diagnosis discovered to be thus at fault, the teeth were extracted; still the condition persisted and the pain increased. She was now kept under treatment over a year, the pharmacopœia being literally exhausted. 'At this period, in consultation, I made a most thorough examination of her system at large. The pain had assumed and continued the impression of an iron clamp around the head, terminating at the chin below, and which clamp seemed daily contracting itself; the terror and pain of this impression had become so great as to convert the patient almost into a lunatic. I found by inquiry that her internal organs had been most carefully examined and inferred not to be in fault; my own investigations therefore were principally directed externally. First, was there any remaining tooth or roots of teeth implicated? I examined for dental caries, for pulpitis, for nodules, for necrosis, for supernumerary teeth, for exposed cementum, but fully assured myself that the dental organs were not at fault. I examined the spinal cord, and through its expressions the encephaloid mass. Organically, the trouble was not reflex from these points; I examined every articulation, the line of every vessel, so far as I might follow them; I passed in review every observation and fact which might enlighten me, but without success; finally I returned to the old cavity; the teeth which had been extracted the year before were the molars and premolars of the left superior jaw; might there not possibly have been left just the smallest particle of one of these roots? I was making pressure over the canine fossa when the patient made slight complaint; it was the only point which had yielded difference in sensation; it was not pain of which complaint was made—not discomfort—it was simply a difference of sensation. What was the meaning of this? Differentially, it was just to infer that here existed something, the lesion perhaps of which we were in search. Acting on this only hint, I obtained the consent of the physician in attendance to make an exploratory trephine into the antrum, and on performing the operation, discovered within the cavity that branches running from the intra-orbital nerve across it, had enlarged to the size of an ordinary knitting-needle; these enlarged nerves, of which there were two, I cut away; the patient was immediately relieved, and although a year has passed, she has had no return of the neuralgia—at least so far as I am aware, and I have since met her upon the streets, looking as rosy and fresh as most women.'"

Epilepsy from Dental Irritation.—"Dr. Nathaniel Field, of Jeffersonville, Ind. (*The Western Journal of Medicine*), states that some years ago a small boy about five years of age, living in his town, while in apparently good health, was suddenly attacked with an epileptic fit, from which he soon recovered. The parents were much surprised at the occurrence, and were unable to account for it. About two weeks afterward he had another strong convulsion, lasting several minutes; but it passed off without any constitutional disturbance. No cause for the attack was detected by him or other practitioners. In a day or two the fits returned, and were repeated at short intervals for about ten days, during which time he is confident he must have had a thousand. Every resource in his power was exhausted to relieve him, and three eminent medical professors examined the child from the crown of his head to the soles of his feet, but no local irritation was detected.

After carefully watching the commencement of the paroxysms, he observed that the muscles of the left side of the face invariably began to twitch on the recurrence of a fit. After a convulsion had passed off, and while in a state of unconsciousness, he raised the upper lip as high as possible, and lo! and behold! the corona of the second canine tooth, instead of having caused by its pressure the absorption of the root of the deciduous tooth, had passed behind it and forced it through the alveolus and gum and into the lip. The gum was slit vertically and the old tooth removed. In less than an hour the convulsions began to subside, and before day they were entirely gone, and never appeared again."—(*The Medical Record.*)

Amaurosis from Dental Irritation.—The *Medical Times and Gazette* states that, "at a late meeting of the Academy, M. Delestre, a surgeon-dentist in large practice in Paris, drew attention to the 'disturbances of vision consecutive to diseases of the teeth, and the operations performed on them,' believing that the connection subsisting between certain cases of impaired eyesight and bad teeth is of far more frequent occurrence than is supposed, and well worthy of the attention of the profession. These disturbances of vision, he observes, ordinarily consist in a mere weakness of sight, but may go on to its complete loss. There is generally dilatation of the pupil, without apparent organic changes. In other cases, the defective sight is brought about by disturbance in the nutrition of the eye, caused by paralysis or reflex contraction of the vaso-motor nerves. Young persons are those chiefly affected. The teeth of the upper jaw, especially the molars, are almost exclusively the causes of these disturbances, which disappear with remarkable rapidity after the teeth are extracted.

"*Compound Comminuted Fracture of all the Bones of the Face.*—A more severe case could not, I think, be imagined. The external wounds, however, were small and insignificant, except one at the root of the nose, through which I could pass a finger into the throat. The face presented the appearance and felt like a bag of marbles. The chief feature of interest was the fact of a vulcanite splint being used inside the mouth (I think for the first time in this district in the treatment of facial fractures), enabling the bones of the upper part to be supported by the lower jaw, which was only divided through the symphysis. The splint was a model of both sets of teeth as far as could be got, and was deep enough to allow of a half-inch hole in front to feed the man through. It was made by Mr. Harry Grove, of this town, to whom all credit is due, and whom I must thank for his skill and kindness in the assistance rendered, without which I do not think it possible that the case could have been conducted to nearly so successful an issue. The man, after having lost a large portion of one lung (sloughed and coughed up), and gone through a severe attack of erysipelas of the head and face, was discharged cured, sixty-one days after the receipt of the injury, which he got in a coal mine by a 'shot' going off before he expected it, and when he was close to it. Cured."—Extract from Report of Walsall Cottage Hospital Practice. By John Burton, Jr.—(*Medical Times and Gazette.*)

Fragilitas Ossium.—In an article on this subject (*Medical Archives*), Prof. Jos. Jones states: "Dr. Paull, of London, has recorded a striking illustration of the *hereditary brittleness of bones, and their repeated fracture in members of the same family.*

"All the members of a family residing in the commune of Offenbach had fractures; three of them had each two fractures; another three; one had even as many as five fractures of one or the other extremity; and to produce these injuries, no considerable violence was in general requisite. The father and grandfather before them had fractures of the limbs.

"Dr. Paull, moreover, described this family as being very healthy, without any scrofulous or other perceptible taint. It is remarkable that not one of them suffered a fracture before the age of eight, so that one might suppose that this peculiar fragility of the osseous matter was developed only toward the age of puberty. Dr. Paull conceived that the condition of this fragility consisted in some change of the chemical constituents of the bones in their relations to each other.

"It has been frequently observed that men addicted to the use of brandy often experience fractures (in consequence of a degree of brittleness induced in the bones), which require a long course of treatment for their consolidation. Dr. Paull met with this fragility of the bones in a subject of this kind, a man 54 years of age, who hung himself at Goechlengen; the ribs, particularly, snapped like glass, and a very moderate force was sufficient to fracture the long bones.

"But if fractures in old drunkards are cured only very slowly, precisely the contrary was the case in the family above mentioned; for in every instance that occurred in it, the fracture was very speedily consolidated, so that generally the callus was perfectly firm at the end of three weeks. When the same bone has been broken a second time, it has never occurred at the seat of the callus."—(*Dublin Hospital Gazette* and *Ranking's Half-Yearly Abstract.*)

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Repair of Organic Injuries.—In an interesting lecture on the treatment of fractures, Prof. James Paget makes the following instructive remarks on vital dynamics (*Lancet* and *Med. News*): "What do we mean when we talk of a man having power enough to repair an injury? It might reasonably be asked, Why is there any necessity for great power for the repair of an injury? As you watch this man you will see that there will be an almost daily question whether the remnant of his vital power (as we say) will not be exhausted in repairing the damage to his limb. There is nothing of acute inflammation, of acute fever, to waste him; that has passed by. Still it is a question whether he will have power enough to repair this fracture, and the sloughing that has ensued.

"We have very imperfect means of ascertaining what amount of force is consumed in the repair of textures. But we do know that there is more force required for development of structures than there is for growth, and more force required for growth than for the ordinary maintenance of the structures; so that a continual expenditure of force is involved in the necessity, not only of maintaining all the tissues of a limb in their natural condition, but much more in that of repairing any damage which that limb has sustained—that is, of producing and organizing a sufficient quantity of material for the repair. In this case a large

quantity of tissue must be formed for the purposes of the repair, and a large quantity of pus will be produced, and in both these processes there will be a large expenditure of vital force.

"I suspect that if the question were asked, why the production of pus is a source of great exhaustion to patients, most of you would be puzzled to answer it. There is nothing in the materials or the chemistry of pus to explain the exhaustion. If you were to measure the quantity of pus which a man produces in a day, and give him the same quantity of milk to assimilate, he would, so far as materials are concerned, be on a nearly exact balance; and yet that amount of nutriment would not compensate for his loss of power in suppuration. I owe it to my house-surgeon, Mr. Butcher, to have suggested to me the real explanation—namely, that it is not the mere loss of material, but the expenditure of force, which exhausts a suppurating man. If pus contained no organized materials, the system might produce the same quantity without exhaustion; but there is a continual expenditure of force in producing and organizing the pus cells, which are the degenerating materials for repair, and in the production of which, doubtless, there is just as much expenditure of force as there would be in the production of so much embryo material of true tissues. This seems to be the explanation of the waste of force which goes on in the process of large repairs; in largely suppurating wounds or abscesses; it is the expenditure of force in the formation of structures, however lowly organized."

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Organization and Absorption of Organic Ligatures.—The Lancet says: "There can be but one opinion as to the importance and interest of the observations of Professor Lister on the antiseptic treatment of wounds, or the ligature of arteries on the antiseptic principle. Whether surgeons accept Mr. Lister's conclusions or not, they must admit the candor with which he reports all details of his experiments, and the scientific strictness and severity with which he observes phenomena. His paper last week is far more than a mere contribution to practical surgery.* It enlarges our ideas of life, and the extent to which the living tissues may be made to assimilate organic substances. And it is a perfect model of the way in which a practical art may be advanced by sound minute physiological observation. We have been accustomed to regard a ligature as a foreign body, more or less irritating, according to the material of which it consisted, but albeit a foreign body exciting suppuration, and only fit to be roughly removed by the surgeon. Professor Lister's experiments lead us to think of a ligature as capable of being absorbed as dead tissues are absorbed, or encapsuled as a metal bullet might be, or incorporated with the tissue of the artery. In the case in which the carotid artery in the calf was ligatured in two places—in one with strips of peritoneum, and in the other with fine catgut—a month after the operation, the animal having been killed, the ligatures were found to have been transformed into bands of living tissue. 'The two pieces of catgut which had been tied round the vessel had become, as it were, fused together into a single fleshy band, inseparably blended with the external coat of the artery.' The ligature of peritoneum was in like manner continuous in structure with the arterial wall. The or-

* Lancet, April 3d, p. 451.

ganization of these ligatures, so evident to the naked eye, was confirmed by microscopical examination of what remained of the ligatures. Only one drop of pus escaped from the wound from first to last.

"When we compare Professor Lister's results and conclusions, in regard to the antiseptic principle, with those of other surgeons, it is impossible not to be struck with the difference between them and him. The physiological phenomena described by him are something most unusual: almost entire absence of pus and of signs of inflammatory thickening, and the incorporation of ligatures used with living tissues, are results very different from the coarse and tedious processes of old surgery. But it will be objected that they cannot be obtained by other surgeons. Be it so. All that we can say is that they are obtained by Mr. Lister, and that he attributes them to a refined and scrupulous carrying out of the antiseptic principle. He looks upon suppuration, putrefaction, and all the coarser processes in wounds, as resulting from the presence of organic germs, which he takes most unwonted pains to destroy by carbolic acid in various forms. We could wish that he had repeated his experiment on the calf, with all the conditions alike, excepting the antiseptic precautions. Still it remains true that Professor Lister has obtained results which are as novel as they are beautiful and important, and that he carries out the antiseptic principle in a way in which, as far as our knowledge goes, no other living surgeon or physiologist does, Lemaire not excepted. We commend his paper to the careful study of the profession."

Deodorized Carbolic Acid.—"It is stated (*Amer. Artisan*) that the odor of carbolic acid may be removed by combining together two parts by weight of gum camphor and one of carbolic acid in crystals, and mixing with whitening. A liquid is thus formed with powerful disinfecting properties, but entirely free from the foul odor of carbolic acid."

"*Recovery from Asphyxia by the Marshall Hall Method.*—We direct attention to a case reported in our columns last week by Mr. Jessop, of Leeds, in which the Marshall Hall Method availed for the restoration of respiration one hour and three-quarters after the patient, a subject of goitre, was supposed to have died. The only indication of life—an important one, it must be admitted—was slight fluttering of the heart at intervals of many minutes. At the expiration of the above period a distinct and convulsive inspiration was observed; in from forty to sixty seconds another followed, and subsequently breathing became established by slow degrees, and with it pulsation at the heart and wrist. The patient remained unconscious for two days. Mr. Jessop on reaching the patient, who was laid out as dead, opened the trachea, and his assistants practiced artificial respiration by the Marshall Hall Method for about two hours. It is difficult to exaggerate the importance of this case. It confirms the high practical value of the Ready Method, and, with others of a similar kind, it teaches us that we must reconsider our ideas as to the time after which suspended respiration may be restored. The case is not more interesting practically than it is physiologically."—(*The Lancet.*)

"*White Gutta-Percha.* By Harry Napier Draper, F.C.S.—Mr. Benger, after justly observing that much of the substance found in commerce,

under the name of 'white gutta-percha,' is adulterated with oxide of zinc, proposes a process for the manufacture of a really pure product. This consists in dissolving the crude gutta-percha in chloroform, precipitating the filtered solution with spirit of wine, and pressing, drying, and boiling the precipitate in water.

"Mr. Benger appears to have been successful; but when it is noted that, according to the data he gives, the production of three ounces of pure gutta-percha requires from five to six pounds of methylated chloroform, and about three pints of spirit of wine, the process does not appear to be very economical, nor is a practical man much reassured on this point by learning that the chloroform and spirit can be recovered; the former by the addition of water and the latter by distillation 'at the leisure of the operator.'

"This process has not even the merit of originality, as it was patented by Dr. Cattell in 1859.

"Dr. Cattell at the same time patented other methods of effecting this object. These depended upon the circumstance that when alcohol or pyroxilic is added in small proportion (the specification says one ounce to each gallon) to a solution of gutta-percha in chloroform or sulphide of carbon, the subsidence of the coloring matter is facilitated. But both Dr. Cattell and Mr. Benger seem to have overlooked the fact that the coloring matter of gutta-percha is quite insoluble in benzöl, chloroform, and sulphide of carbon, and that the alcohol of the specification acts (if at all) only by diminishing the specific gravity of the solvent, in the cases of the two last-named fluids. We set out then with the proposition that all solutions of raw gutta-percha are, properly speaking, solutions of the pure resin only, and that the coloring matter is simply held in suspension in them. If chloroform be employed, it is possible to effect the separation either by adding benzöl so as to reduce the specific gravity, or by entangling the precipitate in some heavy insoluble powder. Carbonate of lead has thus been proposed for this purpose. But discarding chloroform altogether, on account of its high price and specific gravity, there remains to us the choice between benzöl and sulphide of carbon. This choice is easily made. Sulphide of carbon is by far the better solvent of the two; it is quite as cheap as benzöl and is more volatile. This latter is an important advantage.

"Many months since, my attention was directed to a solution of gutta-percha in sulphide of carbon, which, originally used as a cement, had been put aside and forgotten. The coloring matter had formed a compact deposit at the bottom of the bottle, and the supernatant liquor was of a very pale straw color; in fact, almost colorless. I at once made a new solution, and found that, in a narrow bottle, the precipitate soon completely subsided. I then poured my solution upon a sheet of glass contained in a wooden frame, and allowed the sulphide to evaporate, which it does with surpassing rapidity. The films of gutta-percha thus obtained were so very beautiful and so very tenacious that I showed some of them at one of the evening meetings of the Dublin Chemical Club, and described the method by which they were produced, not doubting but that this was new.

"The next day, however, it was pointed out to me that I had been anticipated, and that Payen had obtained a like result in the same way.

"Payen, however, seems to have adopted the method merely as one of analysis, and instead of allowing the precipitate to subside, filtered the

solution. I find that a solution made by dissolving one ounce of raw gutta-percha in a pint of sulphide of carbon, gives a solution from which the clear portion may be decanted at the end of three weeks. Or following Payen, it may be slowly filtered through paper under a bell-jar. And if this be supported on a porcelain dish containing mercury, there will be absolutely less evaporation of the solvent than there would be from the same surface of an aqueous fluid exposed to the air. This method of filtration seems to be capable of very general application to volatile fluids.

"To form thin films, the solution is evaporated on a plate of glass, but as the layer, at the moment of becoming solid, is powerfully contractile, care must be taken to cut it round the edge of the glass, in order to prevent its rupture from end to end.

"A film of gutta-percha thus prepared appears, by reflected light, of a delicate creamy white, and by transmitted light has an opaline semi-transparency. It is remarkably electric, producing, when rubbed between the fingers, in the dark, a flash of light. These thin films have already been put to one useful purpose, that of replacing the ground glass of the photographic camera. It is well known to photographers, that in the image formed on ground glass the most luminous and best defined portion is central, the parts outside the centre being more or less hazy. But if, for the ground glass, a plain glass, upon which a thin coating of the gutta-percha solution has been allowed to evaporate, be substituted, the image is found to be equally illuminated at all points. In microscopic photography, the advantage of this will be readily perceived.

"Gutta-percha thus prepared is a mechanical mixture of the resin with water, which, as do most other resins, it absorbs from the air during the evaporation of the solvent. That this is the case may be at once proved by warming a glass plate bearing a film. The gutta-percha becomes perfectly transparent, and adheres to the glass like a coating of varnish.

"I think I may say, in conclusion, that if this process be not already employed for the industrial production of white gutta-percha, there is no reason why it should not be. The solvent is cheap and the manipulation simple, and if the greater part of the sulphide of carbon were removed by distillation, the cost would be reduced to a minimum."—(*Chemist and Druggist.*)

Collodion for Preserving the Lustre of Metals.—"For the preservation of the lustre of articles of silver or plated ware, when not needed for actual use for a considerable time, a coating of collodion (to be had at the drug stores) may be employed to great advantage. The articles are to be heated, and the collodion then carefully applied, by means of a brush, so as to cover the surface thoroughly and uniformly. It is used most conveniently when diluted with alcohol, as for photographic purposes. Articles thus prepared exhibit no trace whatever of their covering, and have stood for more than a year in shop windows, and in dwellings, retaining their white lustre and color, while other pieces not thus prepared became seriously tarnished."—(*Phila. Ledger.*)

Cement for Fastening Instruments in Handles.—"A material for fastening knives or forks into their handles, when they have become loosened by use, is a much needed article. The best cement for this purpose consists of one pound of colophony (purchasable at the drug-

gists'), and eight ounces of sulphur, which are to be melted together, and either kept in bars or reduced to powder. One part of the powder is to be mixed with half a part of iron filings, fine sand or brick-dust, and the cavity of the handle is then to be filled with this mixture. The stem of the knife or fork is then to be heated and inserted into the cavity; and when cold, it will be found fixed in its place with great tenacity."—(*Ibid.*)

"*Liquid Glue.*—This useful article, which is employed for a variety of purposes, as mending porcelain, glass, mother-of-pearl, etc., is not nearly so good when prepared with vinegar and nitric acid as that obtained by the following process: three parts of glue, broken into small pieces, should be covered with eight parts of water, and left to stand for some hours; one-half of chlorhydric acid and three-fourths of sulphide of zinc must then be added, and the whole exposed to a temperature of from 178 to 192 Fahr. during ten or twelve hours. The compound thus obtained does not gelatinize; it only needs to be allowed to settle, and will be found a most useful agent for joining purposes.—M. Knaffl."—(*Druggists' Circular.*)

Artificial Stone, etc.—The *American Artisan* says that "Mr. Thomas Hodgson exhibited and explained to the Polytechnic Association of the American Institute two methods of manufacturing and moulding artificial stone ornaments, blocks, etc. for buildings. One of these is prepared by treating lime with a solution of four ounces of oxalic acid in a gallon of water, thus producing an oxalate of lime which is mixed with from two to four times its weight of sand. In this condition the material is a moist, friable powder. It is then moulded to the required form in plaster of Paris moulds, removed from the latter, and suffered to dry. It is then preferably placed in a bath of dilute oxalic acid, which causes it to harden throughout, after which it is ready for use. In making the other variety the inventor treats the oxalate of lime with a solution of silicate of potash, thus bringing it to a semi-fluid condition, whereupon it is poured into moulds and suffered to indurate. In response to queries, Mr. Hodgson said that the expense of ornamental devices made of such artificial stones would be but little, say ten or fifteen per cent., more than of common plaster casts, and that the resistance to crushing force would, he believed, be equal to that of most building stone in ordinary use; furthermore, that it had been thoroughly tested with reference to the effects of weather, and found to effectually resist the action of moisture, frost, and sun.

"Dr. Van der Weyde said that the oxalate of lime being one of the most insoluble substances known in chemistry, its employment in the fabrication of artificial stone was a lucky thought. The use of potash and soda compounds for such purposes had been extensively attempted with very poor results, but the oxalate of lime was free from objections which hold good against such compounds. As to the hardness of artificial building materials, all mortars and cements harden with age, and the time will come when substances of this kind used at the present day will be lauded for their hardness and durability, as much as the mortars of the ancients are now. The employment of artificial stone for various purposes is now greater than ever before. The walls of the Suez Canal are built of blocks a yard square, made of lime and desert sand, with a proportion of alumina."

Zinc as a Substitute for Quicksilver in Gold-mining.—The *Scientific Review* speaks as follows of the use of zinc in place of quicksilver in gold-mining: "M. D'Heureuse still pursues his experiments in this direction. He now finds that in the amalgamation process only about half the gold is extracted from the rock. Melted zinc appears to take up all the gold, allows slag and rubbish to float at its surface, requires little heat to keep it melted, and from its volatile nature can be distilled in a retort to separate the gold and re-collect the zinc itself. The mode of operating is simply to introduce gradually the gold-bearing rock, in a pulverized state, into a bath of melted zinc. This metal immediately attacks and dissolves nearly every particle of gold, while the *débris* rises to the surface of the bath and can be skimmed off. When sulphurets are present, the rock must be previously roasted."—(*American Artisan.*)

"*Non-Poisonous Silvering Fluid.*—Nitrate of silver, 2 parts; dissolve distill. water, 36·40 parts; add sal ammoniac, 1 part; soda hyposulph., 4 parts; and lastly whiting, 4 parts. Apply in the usual way."—(*Hager Phar. Centralhalle* and *Druggists' Circular.*)

Silvering without a Battery.—"This is done by rubbing the articles to be silvered, such as thermometer and barometer scales, clock dials, etc., made of copper, with a mixture of chloride of silver, common salt, and tartar, and afterward washing off the saline matter with water. The silver is precipitated from the chlorine, which unites with the copper plate operated on."—(*Ibid.*)

Cleansing Dirty Brass.—"Rub some bichromate of potassa fine, pour over it about twice the bulk of sulphuric acid, and mix this with an equal quantity of water. The dirtiest brass is cleaned in a trice. Wash immediately in plenty of water, wipe it, and rub perfectly dry and polish with powdered rottenstone."—(*Ibid.*)

Tempering Steel, New Mixture for.—"A locksmith at Mulhouse, named Herrenschmidt, claims to have discovered a mixture which is said to give to the commonest steel the grain and temper of the finest cast metal, and, moreover, to have the power of bringing back the original quality of steel which has been burnt. The mixture is composed as follows: with 16 litres of distilled water mix 1 kilogramme of hydrochloric acid, 19 grms. of nitric acid (sp. gr. 1·334), 21 grms. of sulphate of zinc, and 100 grms. of tripoli. In this mixture is to be placed a piece of cast-iron of the first fusion, weighing 100 grms. When the acid mixture has acted for twenty-four hours, the composition is ready for use in the ordinary way, which, in all likelihood, means for cooling therein previously heated steel, and the composition remains effective till it is all used."—(*Mining Journal* and *Chemical News.*)

New Alloy.—"A new alloy, forming, we are told, a beautiful white metal, very hard, and capable of taking a brilliant polish, is obtained by melting together about seventy parts of copper, twenty of nickel, five and a half of zinc, and four and a half of cadmium. It is, therefore, a kind of German silver, in which part of the zinc is replaced by cadmium. This alloy has beeen recently made in Paris for the manufacture of spoons and forks which resemble articles of silver."—(*Amer. Artisan.*)

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, JULY, 1869. No. 7.

ORIGINAL COMMUNICATIONS.

REVIEW OF CONTRIBUTIONS TO ODONTOLOGY.

An Address delivered before the Odontographic Society of Pennsylvania.

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GENTLEMEN:—Custom, and the rules of this Society, make it obligatory upon the presiding officer to deliver the annual address on retiring from the Chair. You have seen fit to re-elect me to that position, for which evidence of your kind personal regard I tender to you my sincere thanks, with the promise to do all in my power to promote the usefulness and interests of the Society. It appears to me that an occasion such as this cannot be more appropriately and profitably occupied than in briefly reviewing the history of Odontology, and making ourselves acquainted with the labors of those who laid the foundation upon which our scientific superstructure rests, so that we may properly appreciate our obligations to them. In doing this, an opportunity will be afforded to pay a tribute of respect to those who have smoothed our pathway; in addition to this, familiarity with the past records of science is the best preparation for becoming contributors to it. It is not my intention to travel the well-beaten track usually pursued by speakers under similar circumstances of inquiring into the antiquity of dentistry, and seeking evidences from history and poetry that it was practiced among the Egyptians, Grecians, and Romans. Taking it for granted that those highly educated and refined peoples carried other arts and sciences to as high a degree of perfection as they did architecture and sculpture, and that dentistry was one of these, although, in the lapse of ages, the evidences have been lost, to a great extent, I propose to confine myself to the consideration of those contributions which relate to the Histology of the Dental Tissues. Hippocrates, Aristotle, Galen,

Vesalius, Ambrose Paré, although they wrote about the teeth, present nothing in relation to Histology, and it was not until the time of Leeuwenhoek, in 1678, that the first step was taken in this department of science, by publishing, in the *Philosophical Transactions* for that year, a valuable paper on "The Microscopical Structure of the Teeth;" in the course of which he says:

"I have some time since applied a glass (esteemed by several gentlemen who had tried it a very good one) to observe the structure of the teeth and other bones, which, both to them and myself also, then seemed to consist of globules; but, since then, having drawn out one of my teeth, and for further observation, applied better glasses than the former, the same gentlemen with myself agreed, from what we plainly saw, that the whole tooth was made up of very small, straight, and transparent pipes. Six or seven hundred of these pipes put together, I judge, exceed not the thickness of one hair of a man's beard. In the teeth of a cow the same pipes appear much bigger, and in those of a haddock, somewhat less."

Malpighi, in 1687, in the Anatomæ Plantarum, Lugd. Batav, describes the teeth as "consisting of two parts, of which the interior, of bony lamella, is formed by fibrous, and, as it were, tendinous hair, woven into a kind of net-work."

Singular to say, the valuable observations of Leeuwenhoek failed to attract the attention of his cotemporaries or successors during the latter part of the seventeenth, the eighteenth, and even the early part of the present century. This fact signally testifies to the remarkable perceptive faculties of this distinguished observer, for with instruments of the most simple character, constructed by himself, he placed on record observations, the value of which has been only within the past thirty years fully recognized and confirmed by observers with instruments constructed by the most experienced and skillful opticians.

To give you some idea of the instruments which made his name justly celebrated all over Europe on account of his many valuable discoveries, I quote the following from the highly interesting and instructive work of Jabez Hogg, F.L.S., on "The Microscope:"

"The microscopes he (Leeuwenhoek) used were all single, and fitted up in a convenient and simple manner: each consisted of a very small double-convex lens, let into a socket between two plates riveted together and pierced with a small hole; the object was placed on a silver point or needle, which, by means of screws adapted for that purpose, might be turned about, raised or depressed at pleasure, and thus be brought nearer to or be removed farther from the glass, as the eye of the observer, the nature of the object, and the convenient examination of its parts required.

"Leeuwenhoek fixed his objects, if they were solid, to these points with glue; if they were fluid, he fitted them on a little plate of talc, or thin-blown glass, which he afterward glued to the needle in the same

manner as his other objects. The glasses were all exceedingly clear, and of different magnifying powers, proportioned to the nature of the object and the parts designed to be examined. He observed, in his letter to the Royal Society, that 'from upwards of forty years' experience, he had found the most considerable discoveries were to be made with glasses of moderate magnifying power, which exhibited the object with the most perfect brightness and distinctness.' Each instrument was devoted to one or two objects; hence, he had always some hundreds by him."

Passing over an entire century from the time of Leeuwenhoek (in which the most notable writers who touched upon the teeth were Duverney, Winslow, Bertin, and Herissant, the latter of whom observed the formation of the enamel), we come to John Hunter, whose well-known work on the "Natural History of the Human Teeth" appeared in 1771, and continued a standard text-book of Dental Surgery almost up to the present time, notwithstanding palpable defects in practice which were pointed out by succeeding writers. His general description of the jaws and teeth, and the changes they are subjected to, evince the acuteness of his observations and the soundness of his views; but he advanced nothing in relation to the Histology of the dental tissues, and speaks of a tooth as "composed of two substances, viz.: Enamel and Bone;" the first composed of striæ passing from the circumference to the centre, and the second analogous to true bone in many respects.*

Dr. Robert Blake, in 1798, wrote a Latin thesis on "The Structure of the Teeth in Man and Various Animals," which he considerably enlarged, improved, and republished in English,—Dublin, 1801. In this able treatise Dr. Blake is evidently entitled to the credit of being the first to point out the *crusta petrosa* or cementum covering the roots of the teeth, and to recognize the existence of three distinct hard tissues in the teeth of man, viz.: *enamel*, *ivory*, and *crusta petrosa.*

Joseph Fox, in 1803, London, published a work on the "Natural History of the Teeth," in which he describes the teeth as "different from bone only in having a covering of enamel, and being more dense."

E. R. A. Serres, Paris, in 1817, published an interesting "Monograph on the Anatomy and Physiology of the Teeth," devoted mainly to the organization of the teeth at an early stage. Speaking of the teeth, he says: "The teeth are composed of three different substances, viz.: enamel, which covers the crown; a bony part, which forms the base; and a soft part, which fills up the internal cavity."

Baron Cuvier, in 1812, Paris, published his work on fossil remains, in

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* A recent edition of Hunter's work has been published under the able editorship of Francis E. Webb, M.D., and Robert F. Hulme, M.R.C.S., whose extensive foot-notes supply many deficiencies, and bring the book up to the present status of science and practice.

the course of which he treats of the structure of the teeth of the elephant. He held that "the different substances which constitute the teeth are produced by excretion, and in layers; that the internal substance, in particular, has nothing in common with ordinary bone but its chemical nature; that it consists of equal proportions of gelatin and phosphate of lime; but that it does not resemble bone in its manner of deposition or its increase." In treating of the tusks of the elephant, he states from actual observation that there is no connection whatever between the pulp and the ivory; and under this head he cites the appearance presented by the decomposition of fossil teeth, as corroborative of his opinion regarding the concentric layers of growth.

F. Cuvier, a nephew and student of the baron, in 1825, published a work on the "Teeth of Mammalia, considered as Zoological Characters," in which he describes the teeth as "appendages to the skin; as analogous in some respects to the other dermal appendages, inasmuch as they are secreted by somewhat similar organs; and, also, inasmuch as they may be said to be dead, being devoid of vessels and nerves, and consequently insensible.

"To whatever set of appendages they may be considered as analogous, the teeth consist of a secreting and secreted portion, at their origin as well as during their whole life. A secreting organ, composed essentially of vessels and nerves, is always placed internally, and is composed of three, or, at least, two other organs. Around this is deposited the secreted portion, formed of a certain number of substances entirely non-vascular, and removed from all immediate connection of the system at large." He recognized "that only three substances enter into the composition of the teeth: one class consists of enamel, ivory, and cortical; a second of ivory and enamel; a third of ivory and cortical; and a fourth of ivory alone."

E. M. Rousseau (another student of Baron Cuvier's), in 1827, published a "Comparative Anatomy of the Dental System in Man and the Principal Animals." This work, which is quite valuable as far as the general anatomy of the teeth is concerned, being, like the preceding one, profusely illustrated with well executed engravings, presents some singular errors in regard to the dental tissues. Describing, for instance, the cortical substance or cement, he says: "It is nothing but dental tartar."

Thomas Bell, F.R.S., in 1829, London, published a work on "Anatomy, Physiology, and Diseases of the Teeth." He says of the teeth, that "they possess vitality, and are connected by their organization with the general system, having nerves, blood-vessels, and absorbents, and are analogous in this respect to true bone. The membrane of the pulp is a production of the periosteum of the alveolus, and the adhesion existing between the membrane and the tooth is owing to the passage of

vessels from one to the other." * * "The ivory of the tooth is secretion from the membrane of the pulp, and not from the pulp itself."

There are several other writers whose names I have passed over. In all the works referred to, it is quite evident that the advantage to be derived from the use of the microscope was entirely overlooked by their authors. This, perhaps, is not so much to be wondered at as their profound ignorance of the valuable observations of Leeuwenhoek. A new era, however, was dawning, in which, by the employment of this instrument in its improved form (the achromatic microscope), an illimitable field was thrown open to the student of nature in every direction, no part of which is more interesting and profitable than that of Dental Histology.

In this work the names of Retzius, Purkinje, Millen, Tomes, Nasmyth, Owen, Kölliker, Czermak, Huxley, and Leidy, stand forth most prominently as contributors to this department of science, and the results of their continual labors now claim our consideration.

(To be continued.)

ON THE NAMING AND NUMBERING OF THE HUMAN TEETH.

BY J. T. CODMAN, BOSTON, MASS.

Read at the Annual Meeting of the Massachusetts Dental Society, May 20, 1869.

In the present mode of naming the human teeth, it is far from certain that out of the various names used and recorded our profession as a body have chosen the most appropriate.

To my mind they have not, and amid the confusion that exists, it is difficult to decide which are the names beyond all others that should be accepted and adopted as the best, and as those that indicate most truly their uses.

I assume the right for our profession above all others to name the teeth—the comparative anatomist excepted; and believe the following to be the names most commonly accepted and used in this country, viz.:

Four incisors; two canines; four bicuspids; four molars; and two wisdom teeth in each jaw.

But in our profession we add to this general naming lateral incisors—coming next to the central incisors—first and second bicuspids, and first and second molars.

As examples of the different ways of naming the teeth, I give the following:

First. Incisors, cuspids, bicuspids, multicuspids.

Second. Incisors, cuspids, premolars, molars, dens sapientiæ.

As a summary, we have in each jaw four teeth named incisors.

The next tooth is named by one of the following terms: *Cuspidatus*, cuspid, canine, or eye.

The two next as *bicuspidati*, bicuspids, or premolars.

The two next as molars, true molars, or multicuspids.

The next one as molar, wisdom tooth, or dens sapientiæ.*

We know not where all these names came from, or who first named the human teeth, or how slowly name after name became attached to them.

It is certain that there is a want of exactness in our naming, even accepting the most approved manner used, and it is doubtful if those who first named the teeth comprehended fully their uses.

We, as dentists, ordinarily name our teeth in a mixed manner, using part of two systems; one a system of numbers, and one a system of attributes: thus, to be exact, if we call the teeth next to the centrals *lateral* incisors, we should call the second bicuspid *lateral* bicuspid, from its similarity of position, it being lateral to or behind the first bicuspid; and then it follows that the second molar must be the lateral molar for the same reason.

It seems to me that the best mode of announcing the teeth by *position*, would be to say, first incisor, second incisor, *i.e.* the lateral incisors; next eye, or cuspid tooth—first bicuspid, second bicuspid; first molar, second molar, third molar, or wisdom tooth. Naming then the position as right or left side, and superior or inferior, jaw or arch; and the position would be exactly defined. This mode is more strictly correct than the former, as the second bicuspid is more behind than lateral to the first bicuspid.

It now remains to be seen if the names of the teeth indicate their attributes or their forms. Incisor means, as I understand it, blade-shaped. If so, that is a form or shape. Cuspid means spear-shaped or pointed. Bicuspid, double-speared or two-pointed. Molar means a grinder, and that is an *attribute* and not a shape; but multicuspid indicates its shape—a tooth with several points or projections. If, then, we adopt the idea of naming the teeth by their *forms*, the word molar must give way to some name indicating the form of the tooth described.

If, however, we name the teeth by their attributes, the name incisor remains good; for that means, as I understand it, cutting-tooth, as well as blade-shaped, and that is an attribute; and it does not do to say cuspid, as that means spear-shaped or pointed; for that is a form and not an attribute, unless the anatomists who named it meant to say a tooth for piercing purposes; but it is not set down so in the books, and we can hardly think they meant so, from the fact that the next teeth are named bicuspid, which is also a shape and not an attribute.

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* There are various other names that may be found, as incisive teeth—primores, etres dichasteres; the small molars or the lesser molars—*dents bicuspidées;* grinders, jaw teeth—*dentes gomphii*, the great molaris; and the third great molaris, as applied to the wisdom tooth.

We cannot name the cuspid tooth canine; for that means a dog's tooth, which it is not; neither does it resemble a dog's tooth, as we might see by the specimens in our cabinet, if we had them here; and it is also a disagreeable and a dishonoring name to apply to a human tooth.

Bicuspid indicates the form, but premolar or fore-grinder, the old name; preparatory grinder, as explaining the uses of these teeth, is much more to my mind.

The name molar explains its attribute perfectly (*meulier*, a miller). Wisdom tooth it ought not to be; tooth of age (dens sapientiæ) may do; but third molar is much preferable to my taste, as more exact.

I think we must all see the jumble we are in regarding these names and positions. I do not propose to dictate any new mode, but simply to mention these facts in order to bring them before the profession, knowing that all errors must be observed before they can be corrected. I desire, before closing this paper, to add some observations of my own on what I consider the characteristics or attributes of the human teeth, as it seems to me that the comparative anatomists have overlooked some of them, and have gone astray; and we, by following in their footsteps, are leading astray our successors by not giving the subject an independent examination. I shall be brief.

The incisors indicate their duty so well that it is hardly worth while to spend a moment in saying that they are formed to split asunder food,—to cut it by occlusion of the points of each set, or by the passing of the points or ends of one set by the ends of the other set, thereby cutting like scissors blades; and by these means severing the mouthful or bite of food from the mass from which it is taken.

The cuspids, upper and lower, reaching beyond the other teeth, with their sharp points advancing before them, *mark* or *score the food*, and make the *size* of the mouthful. They also protect the lips, and, if my observation is correct, the animals who indulge in rough and coarse food and gnaw bones or hard woody fibres, have the cuspids large or formed into tusks of various sizes that advance like the pioneers of an army to clear the way and roughly prepare the food for those that follow. But the first important duty of the human cuspid is to *pierce the food*—to penetrate the shell of nuts or the rind or skin of fruit or any hard substances eaten, and not too hard for these organs. It will not be difficult to prove that the food of man should be of a delicate sort, as it is indicated by the small size of these teeth, they being hardly noticeable as at all prominent in many cases. After the rind is broken, or the hard substance cracked and broken by these human pickaxes, come the bicuspids or premolars to crush into smaller particles the food presented; and when crushed it is passed on to the molars or grinders, where it is, or should be, ground to atoms; and I hold it as a principle that no food should be taken into the stomach except it has been ground to the fine-

ness that these teeth are capable of. And when *universal education* shall spread itself, among the things that will be taught to the youth of this country will be to use the teeth and properly grind their food with them.

I have thus passed rapidly over my ideas of the principal uses of the human teeth, and it seems to me that thus they should be named—not that I propose to rename the teeth, and add to the confusion of the present condition of science; but if they were named in their order in Latin or English—I prefer the English, because I believe it must become the Latin of future nations: the universal language of grand ideas—if they were named cutters, piercers, crushers, and grinders, would not these names indicate their uses better than any names now employed?

DENTITION—ITS PATHOLOGICAL AND THERAPEUTIC INDICATIONS.

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(Concluded from page 298.)

After having thus become informed of the consequences likely to follow tooth development, we naturally become curious to know how such results can be generated by a physiological process apparently so trifling and innocent. Here again we are forced into the speculative, and can but *surmise*. Mr. Fox held as erroneous the commonly entertained opinion "that, as the teeth advance in growth, they gradually find their way through the gums by their own mechanical pressure," for, "during its formation, a tooth is loosely contained in the socket, and can exert no force sufficient to perforate so firm a substance as the gums." He recognizes the fact that a removal or absorption of the tissue is effected, and remarks: "When the absorption of the membrane and the gum takes place early, the child suffers no inconvenience during the progress of dentition; but when the growth of the teeth is too rapid for the absorption of the gums, the dentition is often attended with much pain and derangement of the whole system." It is regarded by Dr. Richardson as a process of removal consequent upon a derangement of normal nutrition, and is thus explained: "When a rapidly growing structure, such as a tooth, presses upon a soft, vascular structure such as the gum, the tooth physically prevents the due nourishment of the soft structures by suppressing, from pressure, the blood supply. Meanwhile, the waste goes on as before, and the balance being thus turned in favor of waste, and the pressure from behind being steadily sustained, the result is inevitable loss of the soft structure, and the advancement of the resisting body beneath."

This is the accepted explanation of gum absorption, yet it seems to be overlooked that there is any other than a propulsive force at work, or a resistance any stronger than that exercised by the tenacity of the superimposed tissues. Now, from the close observance of alveolar changes, we become aware that their emargination or absorption initiates the eruptive phenomena; and, with this lowering of their edges, may not the adherent gum tissue be forcibly retracted upon the edge of the tooth, and thus account for a portion of those indications of force which the progressive growth of a tooth seemed so inadequate to produce? Whether the liberation of a tooth be effected by one or both of these forces, we are aware of the fact that undue pressure may occasion difficulty, not only by the irritation of the nerves of the gum, but also by irritating those of the pulp, which are exceedingly delicate and extensive. Hence we see that, independent of swelling, soreness, redness, and such other external indications, the trouble may be deep-seated, and demand quite as urgently, if not more so, surgical interference for its relief.

We have already apprehended the nervous system as the medium through which local disturbances become generalized; and, says Dr. Richardson, "the effect of dentition in the production of general disturbance affords one of the most striking illustrations of the influence of local irritation upon the body altogether, and of the intimate sympathies of that nervous tie which binds the various organs into one community. Nothing is more purely local than the act of expansion of tooth and removal of gum; nothing more extensively general than the result. The symptoms developing from the local source show their derivation from irregular nervous supply, not merely by their character as symptoms, but by their evanescence and ready disposal when the central evil is withdrawn." The prophylactic treatment consists in removing the child as far as possible from all unhealthy influences, and locating it in a position reputable for pure and bracing atmosphere; strictly observing all the hygienic measures previously referred to; and as a palliative or assistant, furnishing the infant with some yielding material upon which gentle pressure may be exerted, and thus relieve the pain and hasten absorption. For this purpose articles are constructed of wood, ivory, pearl, rubber, leather, etc.; yet a strip of gum caoutchouc will subserve every purpose.

The surgical treatment consists in lancing or incising the gum—an operation calculated to accomplish several indications in accordance with the method of its performance. It is a proceeding relative to the advisability of which a great diversity of opinion exists, and much of the prejudice in opposition thereto is no doubt founded on a misapprehension of its character and objects.

It is by no means a recent practice, its origin dating hundreds of

years back. Ambrose Paré lanced the gums of his children; Harris, Van Swieten, and others performed the same operation, but delayed it until the gum became distended and prominent from the advancing tooth. This brings us to the notice of a theory which, although so ancient, and, apparently, as untenable as ancient, is held up by many at the present time as a strong point in opposition to gum scarification. The opinion entertained is that, by a premature performance of the operation, a cicatrix is formed, so solid in its texture as to offer a serious impediment to the penetration of the gum. However plausible this may seem to the laity, to the reflecting and medically educated mind, it lacks the support of either theory or practice, for we are aware that cicatricial tissue, from its lower degree of organization, is much more susceptible of absorption than more vital tissues,—a fact verified in typhoid and prostrating diseases, where old and perfectly healed lesions are the first to undergo solution and re-establish sores. Now, it seems unreasonable to suppose that gum cicatricial tissue is governed by laws different from the same substance elsewhere; experience forbids the idea, and hence, the opinions of others to the contrary notwithstanding, we believe that, although this so-called retarding element be present, the eruption of the tooth will be much easier than when covered by primitive tissue.

Says Dr. Richardson: "I have frequently incised gums and given much relief by dividing congested vessels, and these gums have healed up, and teeth have made their way again without any greater resistance than in gums undivided. Indeed, the new and annealing matter possesses less resistance, as a structure, than the original gum substance."

Although no surgical interference may be required until an incision would enable the coming tooth to at once protrude, not unfrequently scarification is much earlier indicated,—a fact recognized by Benjamin Bell and Riter, who remark that its late postponement renders it entirely unnecessary, and advise a repetition of the incision if prematurely made.

From explanations already made, it becomes apparent why lancing may be demanded when no external evidences of tooth-irritation are present—as irritation and swelling, or a white, bloodless condition from induced tension; under such circumstances our dental physiology affords our only guide in diagnosis and execution.

Having disposed of one objection, we find another couched in the following words, by a gentleman credited with extensive information upon this subject: "I have known cases in which practitioners had lanced the gums two or three months before the final appearance of the tooth; a practice which is annoying, or useless, or dangerous to the child, and certainly not indicative of much diagnostical power and therapeutical knowledge in the doctor. It is not even uncommon to find a retarda-

tion of the protrusion of a tooth where you expected its daily appearance."

It becomes evident to our minds that the want of knowledge and judgment might, if we were apprised of the circumstances, be justly transferred from the criticised to the critic; and the fact that a tooth may, by frequent and full depletion of the gum, be retarded in its development, is nothing new, and evidence of its ignorance detracts from the reputation of the operator, and not from the value of the operation.

The advantages of the operation are twofold—a direct relief of tension of tissue and of capillary distention by the subsequent hemorrhage; and it is of the latter result that we more frequently, perhaps, wish to avail ourselves; a number of its advocates recognizing most prominently the advantages of local depletion.

Marshall Hall says: "There is no practical fact of the truth and value of which I am more satisfied than that of the effect and efficacy of scarification of the gum in infants, and not in infants only, but in children. But the prevailing, I may say the universal, idea on this subject is, that we should lance the gums only when the teeth are ready to pierce through them, and only at the most prominent part of the gums, and as the occasion to which I have referred may require; and no idea of this important measure can be more inadequate to its real value. The process of teething is one of augmented arterial action and of vascular action generally; but it is also one of augmented nervous action; for formation, like nutrition, secretions, etc., generally, is always a nervo-vascular action, and of this the case in question is, from its peculiar rapidity, one of the most energetic. Like other physiological processes, it is apt to become, from that very character of energy, pathological, or of morbid activity. It is obviously, then, attended with extreme suffering to the little patient; the brain is irritated, and the child is restless and cross; the gums are tumid and heated; there is fever, an affection of the general vascular system, and there are, too frequently, convulsions of various degrees and kinds, manifested in the muscles which move the eyeball, the thumb and finger, the toe, the larynx, the parietes of the respiratory cavities, and the limbs and frame in general; affections of the excito-motor part of the nervous system, and of the secretion of the liver, kidneys, and intestines; affections of the ganglionic division of that system.

"It is to the base of the gums, not to their apex merely, that the scarification should be applied. The most marked case in which I have observed the instant good effect of scarification was one in which all the teeth had pierced the gums. Better scarify the gums a hundred times unnecessarily than allow the accession of one fit of convulsions from the neglect of this operation, which is equally important in its results, and trifling in its character. And it is not merely the prominent and

tense gums over the edges of the teeth which should be divided; the gums, or rather the blood-vessels, immediately over the very nerves of the teeth should be scarified and divided. Now, while there is fever, or restlessness, or tendency to spasm or convulsion, this local blood-letting should be repeated daily, and, in urgent cases, even twice a day. A skillful person does it in a minute, and in a minute often prevents a serious attack; an attack which may cripple the mind, or the limbs, or even take the life of the little patient, if frequently repeated. There is, in fact, no comparison between the means and the end—the one is trifling, and the other so momentous."

This quotation is from excellent authority, yet I cannot help regarding it as a little extreme, and would scarcely indorse the frequent or extensive lancing therein advocated, from fear of provoking trouble as serious as that which I was endeavoring to thwart, besides incurring the risk of permanently injuring the tooth by carrying my incision so unnecessarily deep.

Let me mention a few directions. In the first place, the instrument employed should be well tempered and keen-edged, and may vary in form to meet the fancy of the operator; in the anterior portion of the mouth the plain, conical, double-edged lancet may be used, after having taken the precaution to wrap it with cloth almost down to the point, in order to guard against wounding the cheeks, lips, or tongue. In operating, however, upon the posterior gums, it becomes necessary to have a curved, sickle-shaped lancet; and in order to avoid a multiplication of implements the one should be made to answer in every case; it should be double-edged, in order to cut by both the advance and retrograde motion, although some employ and prefer a single-edged knife.

Being prepared with instrument and napkin, the child should be laid upon the mother's or nurse's lap; one hand employed to keep the child's arms quiet and the other laid over the eyes, to accomplish the double purpose of steadying the head, and preventing such association of the operator and the operation as to excite undue apprehension and resistance should its repetition become necessary.

The practitioner—stationed behind and above the head if operating upon the left side, or in front and above if upon the right side—should separate the jaws and guard the lips with the left hand, while the right is occupied in *slowly* and carefully directing the instrument.

From acquaintance with the physiology of dentition, we learn to direct the point of the instrument toward the labial surface, in order to avoid injury to the posteriorly developing permanent teeth, and also to so regulate the force as to prevent any disfigurement of the semi-solidified enamel of the temporary tooth; although, when ready to protrude, the external structure is sufficiently dense to resist much mechanical violence, and it is only when lancing some time prior to the eruptive period that extraordinary caution is requisite.

That opposition to scarification, which finds its origin in the fear of mutilating tooth structure, is, in the vast majority of cases, as untenable as it is unwarrantable, and is further indicative of a very loose acquaintance with the detail of dental physiology, and a want of confidence in gentle and careful manipulation.

The peculiar character of the incisions is as various as the opinions in relation to their efficacy; some advise a single transverse cut, others a cross incision, others again adopt the former method for the incisors, and the latter for the molar teeth, while a few advise and practice the entire separation and removal of the superimposed gum, in order to frustrate the rapid reparation so generally observed. The compound method now stands almost universally indorsed—the oral teeth are relieved by a single transverse incision, and the molars or buccal teeth by a crucial cut,—the centre of the crown corresponding to the point of decussation, and the cusps to the extremities of the wounds; in this way the most prominent points are at once liberated, and less difficulty is experienced than follows the old method of a right angular division; for, under the latter circumstances, each elevated point is more or less impinged upon by a strong flap of quite broad attachments and tardy absorptive capacity. In making the cuts, it is all-important to thoroughly perform the operation: to penetrate down to the tooth, and to extend the horizontal lines fully up to and a little beyond the limits of the tooth; for if at either extremity undivided edges be left, the results will be but partially satisfactory. Not unfrequently a rapid healing of the wound will necessitate an early repetition of the operation from the returning symptoms of retarded protrusion; and very often, though the most elevated points of the tooth may have escaped, the trouble persists; and, upon close observation, we discover at the lateral edges strong bands of tense fibrous tissue binding the tooth down, the division of which insures astonishingly speedy comfort. Notwithstanding all these undoubted advantages, lancing may, under certain circumstances, be strongly contraindicated; for instance, in cases of hemorrhagic diathesis, its advisability becomes questionable; although, when forcibly demanded, due preventive treatment will materially diminish the difficulties and risks. In cases of debility, where the depletion is unadvisable, tonic and stimulating treatment must precede and follow the operation.

It is more especially, however, in reference to endemic and epidemic influences, which are provoked or intensified by traumatic injuries, that I would give a word of caution; and first among these we observe erysipelas, whose cause has been ascribed to a variety of circumstances, but is still involved in mystery.

There seems to exist in some individuals a constitutional predisposition to the occurrence of erysipelas, which may be developed or aggravated by irritation of the skin, dietetic excess, or any irritating or de-

bilitating influences; but, independent of these, an epidemic influence produces a prevalence of the disorder, not only of limited extent, but frequently so wide-spread as to embrace vast regions of country. There are certain atmospheric conditions which favor its manifestations, such as humid, chilly, and depressing weather; and hence the propriety of postponing major surgical operations until the supervention of more favorable and equable temperature, and the absolute impropriety of performing even so trifling an operation as gum scarification when these influences are conjoined with an endemic or epidemic tendency.

Let me quote from good authority (Dr. Wood): "It is occasionally so strong that the slightest irritation of the surface induces an attack of erysipelas; and when it prevails it is hazardous to bleed, leech, or apply a blister, not to mention serious surgical operations, which are altogether unjustifiable. Wounds about the head are peculiarly liable to this unpleasant complication. It has been noticed that the predisposition to erysipelas exists in the ordinary wards of hospitals at the same time that puerperal fever prevails in the lying-in wards."

When conscious or suspicious of any predisposing influence, the operation, unless urgently indicated, should be postponed, for fear that the wound inflicted may serve as the exciting cause of a troublesome and dangerous form of erysipelatous inflammation. These same remarks will apply, during the existence of an epidemic tendency, to diphtheritis or diphtheria; for an exciting mechanical cause may engender its presence and extension into the larynx and trachea, accompanied with all the dangers characteristic of this pseudomembranous inflammation of the air-passages.

NEUROMATOUS INTUMESCENCE AT FANG OF LEFT LOWER MOLAR; ITS PROBABLE MODE OF PRODUCTION, ETC.

BY B. A. RODRIGUES, M.D., D.D.S., CHARLESTON, S. C.

It is perhaps the duty of those who have long practiced an art with success, to inculcate the principles and rules which experience teaches cannot be neglected without incurring risk, and ought, therefore, to be carefully observed.

We would illustrate the correctness of the above comment, by the details of a case recently occurring in our practice.

A few weeks since a lady of this city presented herself at my hour of consultation, complaining of great pain in a left lower molar, which pain was first periodic, then intermittent, and finally continuous. This lady being as observant of her ease as she was of her appearance, determined to advise with me respecting the case.

The tooth had a darkened appearance, and had evidently been filled with amalgam; there was much tenderness about the gums, which

appeared to threaten an abscess, and increase of pain whenever pressure downwards was made upon the tooth. As we suspected disease at the fang, and as the general condition of the tooth rendered it improbable that any attempt at giving permanent relief would prove expedient, we thought proper to extract it, as in our judgment the shortest, and certainly the surest means of benefiting the patient. The extraction was easy. As we had surmised, there was discovered, pendent to the apex of the fang, a small portion of diseased nerve, terminating, not in an abscess, but apparently in a neuromatous enlargement of that structure. Anxious to determine its relation to the remnant of the nerve of the pulp cavity, we made, with great precision, a vertical section of the entire tooth, and so successfully struck the pulp and dental cavity, as to discover appearances, the history of which forms the object of this communication.

The lady mentioned that the preparation of the cavity for the plug had been attended with so much distress, that the dentist thought proper to introduce two kinds of filling, which, he said, would probably prevent all subsequent uneasiness.

This fact led me to inquire whether the trouble might not be connected with this conjunction of the two kinds of filling, and what might be the nature of the materials that had been used. I therefore endeavored to make such a section as would reveal precisely what had been done, and which has certainly furnished us with a beautiful specimen of dental pathology,—a department of our art in which much remains yet to be done, to elucidate all the possible morbid stages and conditions in these most important organs of mastication.

On examining either surface of the section, it could be seen that the lower part of the excavation was imperfectly filled with gold, and upon this was closely packed a deep layer of amalgam. The remaining portion of the pulp cavity, pertaining to the fang, exhibited such a development of *osteo-dentine*, for a tooth of so *young* an individual, that it was almost entirely obliterated, save through its axial course, which appeared still to contain the remains of the structural elements of the pulp, in a congested, if not inflamed condition, communicating with the pendent nerve filament, terminating in what appears to be a *neuroma.* On slightly polishing the filling along the vertical section-surface, we detected a remarkable phenomenon, in an unmistakably brighter line of metallic lustre, where the two metals came in contact, which I cannot but refer to a sort of electro-galvanic current between the two metals. This accurately defined appearance exhibits some peculiar action, which has, for a time, continued between these different layers of metal, resulting in a series of brightened and somewhat rugged layers, very visible to the unassisted eye. Now, it was this condition of things that seemed to me to interdict in very unequivocal terms, the too frequent use of

different kinds of fillings in the cavity of the same tooth; since such an action, call it by whatever name we please, must beget an excitation about the nerve of the fang, which, in its hyperexcited state, in its turn, produces general vascular action in all the nutritive processes of the part, and possibly explains, in this particular instance, the production of so large an amount of *osteo-dentine* as was observed, filling almost to obliteration the pulp cavity. In so young an individual—not more than about 25 years old—we would not look for the existence, under ordinary circumstances, of more than the thinnest layer of *osteo-dentine;* yet here was an amount calculated to produce atrophy of the entire pulp, rather than any increment, or increase of the same; yet I think it probable that some such obscure action as we have above intimated, slowly but constantly continued in this tooth, may have also excited in the nervous and vascular elements of the pulp the morbid growth in which this branch of the fifth terminated. Of course the presence of this *neuroma* readily accounts for the incessant uneasiness, not to say acute pain, which compelled the extraction of the tooth, nor would relief have been secured by simply removing the filling.

Such are the reflections suggested by the inspection of the beautiful specimen before me, and they are calculated to show the importance of every rule or precept of our art, which is only a science for him who is accustomed to follow a determinate rule of guidance, under every circumstance, and particularly in every operation, even though it be one of minor surgery.

FILLING TEETH.

BY J. S. LATIMER, D.D.S., NEW YORK.

(Continued from page 293.)

In my former communication the pluggers were spoken of in such a way as to convey the impression that only foot instruments were used, whereas only one of this form might be required for the case described, while four or five other forms would be found useful. And, again, in speaking of the gold, I mentioned only the ribbon cut into sections, whereas, for some stages of the operation, I use "plates" formed by folding a strip containing about two grains into a ribbon, from $\frac{1}{12}$ to $\frac{1}{6}$ of an inch in width, and folding the end upon itself once or twice, then tearing it off from the balance of the ribbon. These square plates, first brought to my notice by Dr. Varney, are especially useful in large cavities, and in building contour fillings.

With our floss silk well waxed, our Bunsen burner lighted, our gold ready, pluggers laid in a convenient place, small, pointed gold pliers, and an excavator, holding a small pellet of cotton, wet with creasote, conveniently by, we are ready to wipe the teeth with a small napkin,

and commence the adjustment of the rubber. For this purpose the chair is thrown very far back, and the rubber adjusted in the usual way. It refuses to pass between the teeth, but patient perseverance and the free use of the silk overcome the difficulties. The silk is tied around the tooth or teeth, and the edges of the rubber are drawn back and held out of our way by means of a hook made of a milliner's sewing-needle, or a pin, bent into the form of an interrogation mark (?), fastened to about fifteen inches of tape, at the other end of which a bullet or other small weight is attached. The hook being fastened into the edge of the rubber, the tape is passed back over the head, and the weight hangs down behind the head-rest. This being done to the edges at either corner of the mouth, we have abundant access to the tooth to be filled, which is now dried with pellets of cloth, and the drying perfected by throwing a jet of hot air upon it by means of an instrument not very unlike a blow-pipe, at the larger end of which is a rubber bulb. The tube being heated, the contained air is rendered capable of absorbing more moisture; hence, being thrown into the cavity, it speedily blanches the walls. The rapid and nearly complete desiccation generally occasions a little pain in sensitive teeth, but a touch of the pellet with creasote gives immediate relief. The unabsorbed creasote is now removed with pellets of cloth, and the cavity is ready for filling.

Our assistant, being in position on the left of the chair, wields a light, wooden mallet with his left hand, which practice has made skillful. A small portion of gold is slightly annealed, placed in the retaining point, and condensed with a fine instrument having four serrations, while with another fine-pointed instrument, held in the left hand, the pellet is prevented from withdrawing with the condenser. Several pieces are added, until the gold is securely anchored. We now begin to lay our sections of ribbon in the posterior depression, in such a way that they extend from the buccal extremity of the cavity quite to its palatal opening. These are condensed with what may be described as a hoe-shaped bayonet, nearly like that one found on page 52 of White's Catalogue, and numbered 12, except that it has two rows of serrations. This, with one similar to No. 7 of Atkinson's set (page 54 White's Catalogue), suffice to condense all of this portion of the filling. We once taught that it was damaging to a filling to go over a pellet more than once, because, by so doing, the prominences left on the gold by the depressions of the instrument were broken down, and the adhesion of the next portion of gold rendered doubtful. So far as I know, the question of adhesion is unsettled, but the density and adaptation of the filling are undoubtedly increased by going over the pellet more than once; and experience has taught us that if we keep the filling perfectly dry, and do not attempt to pack too large masses of gold, the danger

to adhesion is very slight. So we go over the pellet until certain that every part of it is uniformly condensed. More than this, we endeavor to *pack toward the walls*, as in this way *only* can we reasonably look for perfection of adaptation.

The linguo-grinding portion being full, we lay upon it a piece of ribbon, and mallet it down with an egg-shaped burnisher, taking care that the instrument does not touch the incomplete portion to which we desire to add the balance of the filling. With a small, two-rowed foot instrument, we now add "plate" after "plate,"—building forward through the connecting canal, and expanding the filling over the floor and walls of the cavity.

Sometimes we do not anneal the pellet, especially in packing against the anterior wall, into undercuts, or where an adhesive pellet would adhere to and condense upon the mass of gold, without going to the place next the wall we desire to reach. The sections of ribbon are extremely convenient for such places. The adhesive ribbons are extended along the floor of the cavity and out to the buccal surface, adding piece upon piece and condensing thoroughly, until the bucco-grinding portion is full. Every portion of the grinding surface, as of the others, is gone over with small and finely-serrated points, made uniformly dense, free from small depressions, and built into a generally concave form, so that very little trimming will be required. We ought, however, to have noticed the occlusion before the application of the rubber, and with special reference to the degree of fullness to be given.

Finally, ribbons or "plates" are laid over the surface, and malleted down with the burnisher. This terminates the introduction of the gold, and we remove the rubber, put away our gold and pluggers, and prepare to trim down our filling. Our finely-cut burs and files are brought into requisition, and we soon reduce the gold to something very nearly approximating the natural contour of the tooth. No part of the filling is left extending over the outer surface of the tooth, forming flanges which are liable to become broken or bent, and so encourage leakage. If depressions appear, in spite of our caution, we dress them out; and should the magnifier reveal the slightest imperfection, next the wall, that might not safely be cut out with bur and scraper, we drill out a small cavity and fill it at once. But this will rarely be necessary if we are particular in the introduction of the gold, and submit it to the magnifyer before removing the rubber dam. A uniform and comparatively smooth surface having been secured with the fine files and burs, we may make the gold ready for the final polish by spending a few minutes with a stick of cotton-wood and very fine pumice.

Lastly, having syringed the pumice from the tooth, we employ calcined rotton-stone upon the stick, and in five minutes have a finish that will wear.

All that now remains is to rinse off the polishing powder and exhibit the result of our labor to the patient, who, if he appreciates it as people generally do, will be willing to pay a remunerative price for our earnest and honest efforts to do right.

MAXILLARY ABSORPTION.

BY WM. H. HOWARD, D.D.S., PHILADELPHIA.

Upon the introduction of this subject to the mind the question arises, What special absorption is there passing in this portion of the economy that requires consideration? I think to dentists (or to any one interested in nature's works) there are local actions progressing, both physiological and pathological, interesting and valuable to ferret out, and well worth a discussion. I shall start with the deposit of earthy matter in the areolar tissue during fœtal life, where we may suppose there exists no special absorption (although there must be the same breaking down and repair that we have in after-life). The calcareous deposits take place in their position in the maxillæ, and the deciduous teeth within, without altering the contour of the soft parts; this process goes on until considerable rigidity is acquired, and, at the same time, the various stages in the formation of the teeth are passed through. When we reach the saccular stage, we have a necessary absorption started in the body of the maxillæ, produced by the elongation of the sac to accommodate a proportionate lengthening of the root of the tooth, which being surrounded on all sides by semi-solid matter, something must give way to the pressure laterally and downwards; the tooth will not, so the bone must, and it does, admitting, at the same time, that the tooth is rising. Yet there are apparent results here which prove to us that there are numerous changes produced by the growth of the dental organs—namely, elongation of the maxillæ, and widening and pointing of the ridges, in the body of the bone, heightened by the addition of material to the processes of absorption. I wish to withhold my theory of the disposition of the material of the *disturbed* cells until another point is reached, at which I can have a more tangible and familiar example to show in proof thereof. We have also at this stage changes throughout the maxillæ at the symphysis, condyloid processes, etc., all tending to symmetry of shape.

At the saccular stage, again, of tooth-formation there is considerable moving and change of position of these sacs, sometimes to accommodate themselves or each other, and at other times again coming into their proper places. In doing this, they are compelled to pass through a semi-solid medium, which must be gotten rid of by absorption, and the space in the rear filled with a material analogous to that disturbed.

The cells do not separate or condense into smaller space for this accommodation, but are actually taken away by the absorbents—a purely physiological action, I apprehend ; but where the pressure is too great, compelling rapid absorption, inflammation supervenes, and here, of course, we have disease.

Now, leaving the saccular stage, either in ease or disease, we come to the eruptive—in which there is an extensive absorption of obstructive material. We soon find the deciduous teeth in position, the permanent set in process of formation, some quite advanced; the child, at the end of two years, having his twenty middle teeth. He lives on, eats sours and sweets, and has pits and caves burrowed into these young organs, not by absorption, truly speaking; although it is an absorption—the same as when we speak of a sponge absorbing water.

Four or five years more pass, and then some more of these perishable members of the human frame show themselves. What change has taken place before they appear? Something we could not see in the roots; which we have not thought of until the teeth were found loose and annoying the patient. On extracting them we generally find very little of the root left—sometimes none. This latter condition is usually the case with the molars. We fully understand the object of this absorption of the root, and see nothing but wisdom displayed in the result; whereas, non-absorption frequently proves a disaster, showing that there is need for this process.

It now becomes our duty, as investigators, to know what is done with all the material taken from these roots; not why, for this we know, and perhaps the wheareabouts of the substance. There is a difference of opinion on this point, and which is the correct theory now comes up for discussion. There were in these roots cementum and dentine which have been removed. My belief is, that they are carried into the venous circulation, back to the arterial circulation, and come again into use in their primitive form, for solidification in the economy. To say that they are taken up by the formative membranes of the tooth seems a presumption which I do not feel willing to support. To suppose that this local use or readaptation of these materials was the case, what would be the result? Perhaps the same as we now find—a beautiful contour formed; but I should fear quite the reverse—indiscriminate growth upon one side, or perfect fusion between the first and second teeth, if not also a fusion with the alveolar walls. The cells are not capable of transformation and use from this state directly; they need resolution. I cannot consider it possible they should obtain this, at or through the formative membrane, any more than old plaster of Paris can be used without recalcination, even admitting the vitality in these cells, which we have not in plaster; of course the comparison is not a nice one, but it may serve to convey the idea.

We have next an absorption in the alveolar walls to permit the large crown teeth to come into place. Here the same process goes on; the bone-substance is not used again directly to supply the wants in the progressive increase of the maxillæ; but is carried into the circulation, and is doubtless used in its circuit to nourish other bones. There are many interesting changes in the maxillæ bearing upon my subject, as those in the lower jaw at the angle, at different periods of life; those following the extraction of teeth; from disease, as alveolar abscess, mumps, etc.

The upper jaw is also affected by the absorptive process—sometimes very considerably deformed from diseases of the maxillary sinus or antrum Highmorianum; in these latter instances accompanying absorption goes on in the soft parts. The same rule in regard to these tissues can be relied upon as that set down for the hard parts.

The causes of absorption seem to be pressure, ichorous fluids or solids, foreign materials, and sometimes it is spontaneous.

The former is most prolific, as in the case of abscess in the maxillary processes after extraction, or from salivary calculus, etc.

The second, viz., ichorous fluids or solids, is from ulcers, fistulous abscesses, etc.

The third, viz., foreign materials, is from decomposed materials, forming mephitic gases, pieces of metal, and necrosed bone, etc.

Fourth, viz., spontaneous—in senility, or in rickety subjects. There *are a few* exceptions in cases not losing the teeth, where the supply in the system equals the absorptive process up to the point of senility.

PROCEEDINGS OF DENTAL SOCIETIES.

STATE DENTAL SOCIETY OF PENNSYLVANIA.

BY GEO. W. NEIDICH, CARLISLE, PA.

THE State Dental Society of Pennsylvania met, pursuant to adjournment, in the hall of the House of Representatives at Harrisburg, June 8, 1869, at 10 A.M. The Society was called to order by Dr. Samuel Welchens, 2d Vice-President, in the absence of the President and 1st Vice-President.

The Board of Censors, through their Chairman, Dr. Gerhart, report that they have examined the Constitution, By-Laws, and lists of members of the following local societies, and find them in harmony with the Constitution of this Society, and that they are entitled to representation in this body, viz.: the Harris Dental Association, the Lake Erie Dental Association, the Odontographic Society, the Susquehanna Dental Association, the Cumberland Valley Dental Society, and the Lebanon

Valley Dental Association. The Board of Censors further report having examined the credentials of the delegates of the above societies; they find them satisfactory, and that the following delegates are entitled to seats, viz.: from the Lake Erie Dental Association, Dr. G. B. McDonneld; from the Harris Dental Association, Drs. P. W. Heistand, M. H. Webb, and John G. Moore; from the Susquehanna Dental Association, Dr. H. H. Martin; from the Cumberland Valley Dental Society, Drs. Geo. F. Platt and J. C. Miller; from the Lebanon Valley Dental Association, Drs. James Fleming and W. K. Lineaweaver. Dr. Robert Huey, from the Pennsylvania Association of Dental Surgeons, was tendered a complimentary seat, he being debarred from becoming a member on account of his society neglecting to present its Constitution, By-Laws, and list of members for examination by the Board of Censors.

The minutes of the last meeting were read by the Secretary, and, after some alterations, were adopted by the Society.

The Society adjourned until 2 o'clock P.M.

AFTERNOON SESSION.

Dr. Amos Wert was admitted to permanent membership, he having been a delegate to form the Society, and having participated in its proceedings, but having no previous opportunity for signing the Constitution and payment of dues.

The Executive Committee report that they have secured the hall of the House of Representatives for the use of the Society during its meetings here; that they have succeeded in procuring a charter from the Legislature of Pennsylvania for the incorporation of this Society, but that, owing to some unknown influence, they have failed to secure legislative enactments for the protection of the interests of the dental profession. The report was accepted. The Charter for the incorporation of this Society was read and accepted.

The Publication Committee report that they have had printed and distributed among the members of the Society 250 copies of the Constitution and By-Laws, and the same number of copies of the bill presented to the Legislature, and that they have purchased the necessary books for the Society. It was moved by the Society that any deficiencies of appropriation be paid by the Treasurer for expenses incurred by this committee. The report was accepted.

The Treasurer was authorized to pay to Dr. W. N. Amer the sum of twenty-eight dollars and twenty-five cents, for expense of publishing and distributing circulars for the call to organize this Society.

The Board of Censors report having examined the act incorporating the Pennsylvania College of Dental Surgery, and that it is entitled to representation in this Society; and further report the credentials of Prof. T. L. Buckingham of that institution as satisfactory.

The Treasurer reports that, after paying the appropriation and orders of the President, he has remaining in his hands a balance of $19.06; referred to the Executive Committee for examination.

The President delivered his annual address to the Society, which was listened to with marked attention, containing, as it did, much advice in regard to the workings of the Society. A vote of thanks was extended to the President for his able address.

The Secretary read a letter from Dr. J. G. Ambler, of New York City, delegate from the New York State Dental Society, regretting his inability to be present, but extending cordial greetings from that society to this body. The letter was ordered to be placed on file by the Secretary.

On motion, it was resolved, that when we adjourn, we do so to meet in the City of Pittsburg.

An essay was read by Dr. Samuel Welchens, on "Dental Hygiene," which was well received, and for which a vote of thanks was extended; referred to the Publication Committee.

The election of officers being next in order, Drs. McCalla and Templeton were appointed tellers by the Chair, and, on ballot, the following officers were elected for the ensuing year, viz.:

President.—Prof. T. L. Buckingham.

1*st Vice-President.*—Dr. Geo. B. McDonneld.

2*d Vice-President.*—Dr. James Fleming.

Recording Secretary.—Geo. W. Neidich.

Assistant Recording Secretary.—W. Nichols Amer.

Corresponding Secretary.—Samuel Welchens.

Treasurer.—John McCalla.

Board of Censors.—Drs. A. B. Robbins, W. K. Brenizer, H. H. Martin, H. Gerhart, and W. N. Amer.

Publication Committee.—Prof. James Truman, Drs. John McCalla, T. C. Stellwagen, J. L. Suesserott, J. W. Moffitt, Saml. Welchens, and Geo. W. Neidich.

Executive Committee.—Drs. J. G. Templeton, G. B. McDonald, A. B. Robbins, J. G. Moore, and Prof. James Truman.

The following delegates were appointed by the Chair, viz.: To the American Dental Association, Drs. G. B McDonneld, H. H. Martin, J. W. Moffitt, W. H. Scholl, Saml. Welchens, James Fleming, A. B. Robbins, and H. Gerhart; to the Ohio State Dental Society, Dr. J. G. Templeton; to the New York State Dental Society, Dr. A. B. Robbins.

On motion of the Society, the officers elected will commence their duties at the close of the session, which shall be a precedent for all elections hereafter.

The Executive Committee is requested to invite the resident dentists and physicians of Harrisburg to attend the meetings of this Society and participate in its deliberations.

The President elect, Prof. T. L. Buckingham, was requested by the Society to deliver a public address at our next meeting, in Pittsburg.

Adjourned until Wednesday at 9 A.M.

WEDNESDAY MORNING.

The bill presented to our Legislature being the special subject for discussion this morning, Dr. J. W. Moffitt, of the Executive Committee, mentioned the objections urged against its passage, after which the subject was discussed by the different members; and, on motion of the Society, the revision of the bill to be presented to our next Legislature was referred to a special committee for that purpose; said committee to consist of Dr. A. B. Robbins, Prof. T. L. Buckingham, Dr. John McCalla, Dr. H. H. Martin, and Dr. James Fleming.

On motion, resolved that this Society recognizes and adopts the essential features of the Code of Ethics of the American Dental Association.

On motion, the time allowed to each member wishing to speak was limited to ten minutes.

The subjects of "Irritation of the Mucous Membrane," and "Constitutional Effects of Mercury produced by the Use of Vulcanized Rubber as a Base for Artificial Teeth," were discussed by almost every member; also, the "Degradation of the Mechanical Branch of the Profession by the Introduction of Vulcanized Rubber."

The President, Dr. A. B. Robbins, minutely described his method and appliances for correcting an intricate case of irregularity of the teeth, and contraction of the dental arch, exhibiting casts showing the progress made at different stages of the operation.

The Executive Committee report having examined the Treasurer's account, and having found it correct.

Drs. McCalla and Templeton were constituted a committee to conduct the President elect to the chair.

A vote of thanks was extended to the retiring officers, for the manner in which they had conducted the proceedings of the Society.

On motion, the Chair appointed Drs. McDonald, Templeton, McCalla, and Suesserott, essayists for our next meeting.

An essay was read by Dr. Geo. W. Neidich, on the "Histology of the Dental Tissues," for which a vote of thanks was extended, and which was referred to the Publication Committee.

The following amendments to the Constitution were proposed by Dr. A. B. Robbins: 1st. That Art. XI. be amended by substituting "the members present" for "a full quorum." 2d. That a new article be added, to read thus: "Certificate of Membership. Any member of the State Dental Society may, upon passing a satisfactory examination by the Censors, receive a certificate of membership, under seal, signed by the Censors, President, and Secretary."

Prof. T. L. Buckingham was constituted a committee to procure an appropriate seal for this Society.

Adjourned, to meet in the City of Pittsburg, on the third Tuesday of June, 1870, at 10 A.M., the session to continue three days.

PROCEEDINGS OF THE ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

BY THOS. C. STELLWAGEN, M.D., D.D.S., PHILADELPHIA.

THE regular monthly meeting was held on Wednesday, June 2d, 1869.

The President in the chair.

The following gentlemen were unanimously elected members of the Society:

Active Members.—Drs. Henry L. Gilmour, J. L. Baker, R. R. Underwood, and George S. Nyce, all of Pennsylvania.

Corresponding Members.—Drs. C. B. Rising, T. L. Beers, Ill.; Dr. T. B. Gunning, J. S. Latimer, New York City; A. J. Snead, Va.; Jos. Holmes, Ohio; and F. K. Crosby, Boston, Mass.

The essay of the evening was read by the author, Wm. H. Howard, D.D.S. Subject—"Maxillary Absorption."*

Dr. Eisenbrey alluded to the difference of opinion as to whether the absorption of the roots of the deciduous teeth was due to pressure, the action of an acid secretion, or want of material; he inclined to the latter,—that is, disintegration is in excess of integration, hence a gradual disappearance of the roots from want of sufficient assimilation, as sometimes the roots of the temporary teeth are found to be absorbed before the permanent are in close proximity to them. In fact the word temporary explains all. Nature has a demand for them, and while that demand lasts, supports them; and when they are no longer needed, she withdraws that support; they break down, and those teeth that remain in longer than the usual time is proof conclusive that they had not fulfilled their mission yet, and nature held fast to them.

Dr. Trueman was disposed to think absorption was the result of pressure, as he had seen the middle of the root sometimes affected when the apex was left in a normal condition; this he considered owing to the presentation of the second tooth to that part of the first.

Again, it is the experience of most dentists that sometimes the milk teeth are retained and do good service until quite late in life, when from some cause the development of the adult teeth has been arrested.

He alluded to an absorption of the second teeth, which he had occa-

* See page 355.

sionally met with around their necks due, as he concluded, to diseased action.

Dr. Breen coincided with Dr. Trueman, especially where he referred to the eruption of the permanent teeth at a late period in the life of the patient, and spoke of several cases, one of which was a child of 10 years of age, with only its permanent central incisors and first molars erupted, the rest of the deciduous teeth being intact.

Dr. Nones took up the consideration of the general alterations met with after extraction of the permanent teeth, giving hints concerning the preparation of the mouth for artificial teeth mounted on plates.

Dr. Stellwagen, when thinking over the subject-matter of this paper, could not refrain from quoting the words of Gabriel Andral, eminent as a physician, famous as professor of hygiene, and afterwards of pathology and general therapeutics in the Medical School of Paris, who says: "The economy does not appear to be more than a *great whole*, indivisible, in the state of health as in the state of disease."

If this be true—and who will dispute it?—we must look for the cause of this process, not here alone, but throughout the whole system, and the numerous well-known cases of the absorption of superfluous material, or organs rendered useless by the changes of the economy that take place in obedience to physiological as well as pathological laws, will all open to us means for the study of similar actions under various circumstances.

Indeed, many acts of nature, seemingly far more wonderful than this of the exuviation of the deciduous teeth, may be quoted; among which are the great changes which occur to the umbilical vessels at birth, transforming almost immediately the grand channel of fœtal life into a mere appendix, much of which is not only useless, but actually offensive, and is consequently wisely removed by the accoucheur.

Pressure may have something to do with the removal of the roots of the milk teeth; but no doubt the same cause that stimulates the development and growth of the adult teeth enables them, as they increase in size and importance, to appropriate to themselves all spare tissue which can be dispensed with in other parts of the economy. What this cause is he felt that we were perfectly ignorant of. As an example of how pressure may cause absorption or interfere with nutrition, he mentioned, as familiar instances, the appearance of a finger upon which a ring has been worn for some time, the mouth after wearing artificial plates, irregularities of the teeth, their causes and corrections.

Dr. Pike gave as his opinion, that pressure might hasten, but was not absolutely necessary to accomplish, this action. The absorbed material, he believed, must pass through the general circulation to be purified and invested with all that is required for the forming tooth.

Dr. McQuillen—directing attention to the beautiful and instructive series of twenty French preparations in the museum of the College, demonstrating the changes occurring in the jaws and teeth from the period of fœtal existence until extreme old age—said, that in examining these carefully, one cannot but be impressed with the valuable lesson which they teach of the economy of nature in providing ample room for the development of the deciduous and permanent sets of teeth in the contracted space afforded them in the jaws. When observing the peculiar positions which the crowns of the permanent teeth occupy in the jaws, and the relation they bear to the roots of the deciduous set, it is a matter of surprise, not that the permanent teeth are occasionally irregular, but that they should ever assume the symmetrical relation which constitutes their normal condition when erupted. This result is due, in the language of Herbert Spencer, to the fact "that development is a change from the incoherent, indefinite homogeneity, to coherent, definite heterogeneity." The mutations taking place in the jaws and teeth are but typical of the changes occurring in every part of the organism dependent upon waste and repair; and although the two operations vary in their relative rates at different periods of existence, repair is everywhere and always making up for waste. Any explanation of the absorption of the jaws and teeth that ignores the operation of this law is not only unphilosophical, but utterly without foundation.

Dr. Pike had been led to think that there might be some acid secretion around the root of the tooth undergoing absorption, as he had found blue litmus paper respond to it if used quickly, before the blood started, after an extraction.

Dr. Eisenbrey advised that this experiment be made by applying the paper to the root of the tooth.

Dr. Stellwagen proposed the use of the ether spray producer, which he thought would sufficiently retard the flow to enable one to test both the socket as well as the root of the tooth.

Dr. Howard asked if this acid reaction might not be due to an accidental decomposition of foreign substance, as food, etc., around the necks of the teeth.

Dr. Trueman then exhibited an instrument of an old pattern for condensing a filling by the pressure gained from the patient in biting upon it; he thought it sufficiently useful to warrant its reintroduction to the profession. He also had with him several styles of drills which he recommended; among these were the twist and rose head, the latter having a prominent edge extending across the top, which greatly facilitated its cutting.

A paper translated from the German by Adolf Petermann, D.D.S., of

Frankfort-on-the-Main, was then read: it was entitled "Pathology of the Teeth," by Prof. Rudolf Hohl, M.D.*

The Society then adjourned, as is customary at the June meeting, until Wednesday, September 1st, 1869.

ILLINOIS STATE MICROSCOPICAL SOCIETY.

We take pleasure in presenting the following extract from a report, occupying an entire page of the Chicago *Times*, of a *conversazione* of the Illinois State Microscopical Society, given at the residence of Joseph T. Ryerson, Esq., of Chicago, on Friday evening, May 28th. As a meeting of social and scientific interest, as the reporter justly remarks, "this *conversazione* may well challenge comparison with any heretofore attempted, while in many of its features it is entirely new, not only in our own city and State, but in the United States." An elegantly engraved card of invitation was sent to a number of gentlemen, residing in Chicago and at a distance, a majority of whom were in attendance, with their ladies, conferring an additional grace and interest upon the occasion.

Donations were announced, as follows:

From C. C. Merriman, Esq., Rochester, New York, 24 slides Algæ—admirably mounted under a film of collodion—for the polariscope.

From W. H. Walmsley, Esq., of Philadelphia, 10 exquisite preparations of various subjects.

From Lt.-Col. J. J. Woodward, M.D., of the War Department, Washington, 12 fine photomicrographs, by Maj. Edward Curtis, M.D., of the same department.

Letters of regret in being unable to attend the *conversazione* were read from Rev. James DeKoven, D.D., Warden of Racine College; Dr. J. H. McQuillen, Corresponding Member for the State of Pennsylvania; and W. H. Walmsley, Esq., of Philadelphia.

The following gentlemen were elected:

As Corresponding Members for District of Columbia, Brevet Lt.-Col. J. J. Woodward, M.D., War Department, Washington. For the State of Maryland, Christopher Johnston, M.D., Professor of Principles and Practice of Surgery in the University of Maryland. For the State of New York, Professor H. L. Smith, Hobart College, Geneva, N. Y.

As Honorary Members for the State of Pennsylvania, William H. Walmsley, Esq., Philadelphia; of the Province of Quebec, Rev. Robert H. Walker, M.A., of Wadham College, Oxford, England, and Rector of Bishop's College, Lenoxville.

The President, Dr. W. W. Allport, then delivered the following address:

Ladies and Gentlemen:—The character, as well as the large number present this evening, indicate an interest felt by the most respect-

* It will appear in the next number of the Dental Cosmos.

able and influential portion of our citizens in the State Microscopical Society of Illinois, hardly hoped for by its projectors and those who were the most instrumental in its organization.

In view of the manifest interest felt in this Society, I have been requested to state to you its origin, present condition, and objects, as well as some of the uses of the microscope.

In the early part of the past winter a circular was issued from the Chicago Academy of Natural Sciences, inviting all those in the city who took an interest in microscopical investigations to meet at their rooms, for the purpose of organizing a microscopical section to the Academy.

Agreeably to this invitation, quite a respectable number of gentlemen met. At this meeting a diversity of opinion existed. Some were in favor of a society that should work in connection with the Academy, while others wished a separate organization. A committee was appointed to take the matter under consideration, and to report their conclusions, and a plan for organization, at a subsequent meeting. After holding several meetings, at which the report of the committee and the views of the various gentlemen present were freely discussed, it was thought that an independent society could be more easily managed, and that more good could be accomplished by it than by working as an adjunct to any other society. As a result of this conclusion, a temporary organization, which has been known as the Chicago Microscopical Club, was formed. A bill was immediately prepared and sent to our State Legislature, and a law was passed incorporating the State Microscopical Society of Illinois, under which act of incorporation we are now organized and acting, and into which the Chicago Microscopical Club has been merged.

From the statement I have made, you will see that our Society is but a few months old, and yet I am pleased to state that we have some sixty resident members, among whom are some of the leading members of the medical profession and the best amateur microscopists of the city and State. Hardly a meeting has passed recently at which we have not received donations to our cabinet, either from our own members or from microscopists residing in different parts of the country, some of which, as you will see, are exceedingly rare, beautifully prepared, and artistically mounted.

We are also receiving offers of exchanges and donations from prominent microscopists and the officers of kindred associations, not only at home, but abroad. The proceedings of some of our meetings have been published in the scientific journals of Europe, as well as of our own country.

From the past, the Society has every reason to be encouraged and to look with hope to the future; expecting, as it does, that its list of resident working members will be largely increased at our next meeting, which, in accordance with the provisions of our by-laws, will not occur until the first Friday in October.

In addition to resident membership, the by-laws of the Society provide for honorary, associate, and corresponding memberships. And, while we intend to be somewhat liberal in the admission of resident members, care will be exercised to admit none to the other memberships whose names would not be an honor to the Society, or whose contributions will not increase the interest of its meetings, and the usefulness of the Society.

The leading object of the Society will be the cultivation of microscopy in the investigation and demonstration of the views that propose scientific subjects, and special committees have been appointed for the systematic investigation of Floral Structures, Infusoria, Cryptogamous Plants, Vegetable and Animal Histology, Vegetable and Animal Pathology, Vegetable and Animal Parasites, Crystallography, and kindred branches, during the ensuing year. Besides which it is desired to make the microscope useful in social and commercial interests, by detecting adulteration in food, and fraud in fabrics, and to exhibit from time to time, so far as may be possible, to such of our citizens as may appreciate it, the minute handiwork of our Creator, as it can be seen in no other way than through the almost infinite vision of the microscope.

In all of His works, however we may enlarge or refine our vision, we find nothing common or unworthy of our careful notice. The eager traveler crosses oceans and continents, climbs rocks and mountains, that he may gaze upon the beauties and wonders of the landscape; unmindful, too often, of the not less wonderful creations that surround his path and are crushed beneath his feet.

The wayside flower, the springing leaf, the tuft of moss, the blade of grass, or tiniest insect often reveals, under the microscope, colors that contest in brilliancy and beauty with the rainbow and sunset, and form more subtle grace and delicate tracery than sculptors have ever chiseled or artist's pencil can hope to rival

There are few things about which the public have a more erroneous impression than the use of the microscope. The popular notion that microscopy is one of those abstruse sciences the acquisition of which requires years of study and patient practice, is an error, as it is a simple art, easily acquired. The microscope is merely an instrument of observation. It sharpens the eye, and peers into everything. No invention of man has a wider range of application in its uses. It should be the companion not only of the scientific, but it might with profit be found in every counting-room, workshop, and household. As an instrument of education it has no equal, and no school-room should be without it.

From the fact that the microscope has been so extensively used by scientific men, let no one suppose that it is for the exclusive use of gentlemen. The ladies, with their quick perceptions, refined organism, and delicacy of touch, are peculiarly adapted to manipulate both instrument and objects, and there is no reason why practice would not render them skillful microscopists. Besides the instruction and personal pleasure derived from the use of this instrument, ladies would find it to be an easy and agreeable way of entertaining their friends. They would also find many valuable hints in the delicate tracery of minute organisms visible only under the microscope, which would suggest beautiful designs for their embroidery and fancy work, and its skillful management by them might with propriety be regarded as a refined accomplishment.

As a teacher of theology this brazen tube has no rival. No doctor of divinity, however learned and eloquent, can so successfully urge the fallacy and utter absurdity of atheism, and rout with shame and confusion the advocates of infidelity. For it reveals in every atom of the universe that "the hand that made us is divine."

So "he that hath eyes to see, let him see," and, in the beautiful lines

of Young, so appropriately placed on the programme of the evening by our efficient Committee of Arrangements:

> "Think naught a trifle, though it small appear;
> Small sands the mountain, moments make a year;
> And trifles, life."

THE EXHIBITION.

It was truly a beautiful scene. The spacious drawing-rooms were filled to repletion with a brilliant company, but only intent upon seeing and enjoying the objects of interest by which they found themselves surrounded and tempted.

Upon the great table in the ear drawing-room were arranged thirty microscopes, with their glittering and beautiful apparatus.

Each instrument had attached to it a card, with the name of the exhibitor, and the object exhibited. Down the centre of the table was arranged, by Mr. H. M. Wilmarth, a suitable apparatus for the due distribution of light to the instruments.

The following is a catalogue of the exhibitors, the instruments, and the objects exhibited:

No. 1. J. T. Ryerson, Esq., Dallmeyer, London, proboscis of the house-fly.

No. 2. F. V. Wadskier, I. P. Cutts, London, corpuscles in human blood, T. L.

No. 3. Geo. F Ramsey, Pike, New York, the Lord's Prayer written with a diamond in a space the 100th part of an inch in diameter.

No. 4. I. G. Langguth, Jr., French, eye of cockchafer.

No. 5. Dr. H. Webster Jones, Grunow, New Haven, trichina in pork, T. L.

No. 6. The Secretary, Smith & Beck, London, arachnoidiscus, T. L.

No. 7. A. A. Munger, Baker, London, polycystina, T. L.

No. 8. M. Polachek, French, spiral vessels from rhubarb.

No. 9. E. S. Pike, Boston Optical Works, accidium grossularia.

No. 10. W. Henri Adams, Bulloch, Chicago, diatoms from the Sandwich Islands.

No. 11. The President, books and plates, synapta digitata, Buffam, Lake County, Ill.

No. 12. The Secretary, Society of Arts, prize microscope, the first mosquito of the season.

No. 13. M. Polachek, Nachet, Paris, clematis vitalba.

No. 14. Dr. Benjamin Durham, J. W. Queen & Co., Philadelphia, pampas grass.

No. 15. Dr. Daniel T. Nelson, W. H. Bulloch, Chicago, trichina spiralis, from human muscles, T. L.

No. 16. John B. Gerard, McAllister, Philadelphia, spiracle of the drone-fly, T. L.

No. 17. Dr. George H. Cushing, J. Zentmayer, Philadelphia, cricket's gizzard, T. L.

No. 18. Samuel Johnson, W. H. Bulloch, Chicago, trachea (breathing apparatus) of the silk-worm, T. L.

No. 19. M. Polachek, elytron of beetle (opaque), light reflected.

No. 20. Secretary of the Chicago Academy of Sciences, Powell & Leland, London, bones of the starfish (opaque).

No. 21. Dr. C. H. Hollister.

No. 22. The Secretary, Smith & Beck, London, weissa viridula, illuminated with parabola, with Ross' new four-inch objective.

No. 23. William C. Hunt, Nachet et Fils, Paris, lung of frog (opaque).

No. 24 George H. Hathaway, Dresden, "Lady of the Period," our ant, T. L.

No. 25. Dr. R. Ludlam, Buffam, Lake County, Ill., marine algæ callithamnion hookier, T. L.

No. 26. Dr. H. A. Small, Buffam, Lake County, Ill., tongue of snail, T. L.

No. 27. H. F. Monroe, arachnoidiscus, T. L.

No. 28. Geo. M. Higginson, W. H. Bulloch, Chicago, fresh flowers—arbutelar, cinneraria, cuphea, verbena, and geranium—and polariscope.

No. 29. Foster & Boerlin, human flea.

No. 30. Foster & Boerlin, fossil earth from Nottingham, Md.

No. 31. Foster & Boerlin, proboscis of butterfly.

No. 32. Foster & Boerlin, dust from miller's wing.

No. 33. Foster & Boerlin, feet and legs of dytiscus.

No 34. Foster & Boerlin, leg of flea.

No. 35. W. H. Bulloch, human hair.

No. 36. Foster & Boerlin, hair of mouse.

No. 37. Foster & Boerlin, photograph of the Declaration of Independence.

No. 38. J. G. Langguth, Jr., spicules of sponge.

No. 39. John Corbutt, diatoms from guano.

No. 40. Foster & Boerlin, photograph Trafalgar Square, London.

No. 41. J. Horace Tracy, W. H. Bulloch, Chicago, circulation of blood in foot of frog.

No. 42. S. A. Briggs, W. H. Bulloch, Chicago, Moulin Diatome plate.

Nine others not entered in time for catalogue.

Upon the table in the library were displayed fifteen instruments, exhibiting the following objects:

By Foster & Boerlin—Photograph of Trafalgar Square, London.

By John Corbutt—Diatoms in guano.

By J. G. Langguth, Jr.—Spicules of sponge.

By Foster & Boerlin—Photograph of the Declaration of Independence, with photographs of prominent men of the time surrounding it.

By Same—Hair of the mouse.

By W. H. Bulloch—Human hair.

By M. Polachek—Elytron of beetle, opaque, light reflected.

By Foster & Boerlin—Leg of a flea.

By Same—Feet and legs of dytiscus.

By Same—Dust from a miller's wing.

By Same—Proboscis of butterfly, light transmitted.

By Same—Fossil earth from Nottingham, Md.

By Same—Human flea—Binocular.

By Same—Simple microscope, with object.

By the Secretary Society of Arts—Simple microscope.

The instruments, apparatus, and objects exhibited on Friday evening represent a money value of not less than $6000, and when to this sum is added at least $1000 more for libraries in this connection, a total of $7000 is exhibited as devoted to this special and delightful pursuit—

a remarkable showing for a city of pork and breadstuffs; and yet not remarkable, for it is a part of history—and no uninteresting part either—that literature and the arts have always received their greatest strength and greatest impulse from just such commercial centres as our own.

MASSACHUSETTS DENTAL SOCIETY.

The annual meeting of this Society was held on Thursday, May 20, 1869, at the Hall in Temple Place, Boston, Mass.

Dr. E. G. Leach presided over a large attendance.

The following officers were elected:

President—Dr. T. H. Chandler; First Vice-President—Dr. G. L. Cook; Second Vice-President—Dr. J. A. Salmon; Recording Secretary—Dr. A. Brown; Corresponding Secretary—Dr. E. Blake; Treasurer—Dr. J. T. Codman; Librarian—Dr. G. T. Moffat; Microscopist—Dr. T. B. Hitchcock.

The following gentlemen were chosen as delegates to the American Dental Association:

Drs. E. G. Leach, T. H. Chandler, J. Ham, E. Waters, E. Blake, N. W. Hawes, A. A. Cook, S. F. Stearns, C. H. Osgood, and C. E. Thompson.

The usual committees were also chosen, after which the orator for the next year was balloted for, and Prof. L. D. Shepard was elected, and Dr. E. Blake appointed substitute.

Dr. A. A. Cook, of Milford, then delivered the annual address. He contended that the dental profession was no longer a mere calling, but that it had attained a superior dignity, and should be numbered among the liberal professions. A dentist should be a man of broad and liberal views and elevated principles. When he said man, he wished it to be understood that it was conceded by all that effeminate masculinity should stand on a par with masculine effeminacy. Gallantry demanded, and the profession should concede, that, other things being equal, women should not be proscribed. But it was a question if her finer nature would not shrink from such work as the dentist was at times called upon to perform. There might be exceptions; and perchance there might arise at some future day a rivalry of sexes in the dental profession as there was already in the medical profession. Possibly the profession would suffer no detriment if she were admitted; and if the patient preferred the soft and gentle manipulation of the fair one to the rough treatment of the unfeeling practitioner, her admission to the profession must be endured as of the inevitable. Referring to the coming dentists, the speaker said they should be educated men, scientists, anatomists; they should be raised to the standard of the diploma, and not have the diploma brought down to their level, as he was sorry

to say was too often the case at present. As the domain of science shall be extended, by the intelligent use of the microscope and of other scientific instruments, he hoped the dentist of the future would reap largesses fully equal to the harvest already gathered. The address closed with an eulogistic biographical sketch of Dr. Seth P. Miller, a member of the Society, who died in December last, in whose death the Society had suffered an irreparable loss.

Interesting and instructive essays were read. The President's (Dr. Chandler) was on "The Comparative Anatomy of the Teeth;" another, on "The Importance of Cleansing the Teeth," was read by Prof. T. B. Hitchcock; and another, on "Dental Nomenclature," was read by Dr. J. T. Codman.

Professor George T. Moffatt, of the Harvard Dental School, exhibited a case of successful repair of a fractured tooth by supplying a mineral front, the nerves of the tooth being still alive. The operation has never before been successfully performed, as it requires extreme delicacy of manipulation, with great patience and invention. The patient was a boy fourteen years of age, who had fallen on the ice while skating. He was present, and the members, after an examination of the repaired incisor, were unanimous in approbation of the professor's skill, and warmly congratulated him on his success.

The annual dinner was held at the Tremont House, at four o'clock, and was attended by about one hundred members.

The session, which has been an unusually interesting one, shortly afterward adjourned.—*Boston Journal.*

FOREST CITY SOCIETY OF DENTAL SURGEONS.

The first annual meeting of this Society was held at Cleveland, O., at the office of Dr. Strickland.

The following were chosen officers for the ensuing year:

President.—B. Strickland.

Vice-President.—B. F. Whitslar.

Recording Secretary.—H. L. Ambler.

Corresponding Secretary.—Chas. Buffett.

Treasurer.—F. S. Slosson.

Councilmen.—Drs. Terry, Palmer, Butler.

Delegates to the American Dental Association.—Drs. Palmer and Butler.

Dr. L. Buffett remarked at length upon the treatment of pericementitis successfully by the hypodermic use of morphia.

Dr. H. L. Ambler exhibited an artificial nose of rubber, made for a patient who had lost all of his but the tip and a small portion of the alæ.

Dr. Butler remarked at length upon the action of arsenious acid upon the tooth-structure and dental pulp. He never uses it for obtunding sensitive dentine, as the result is surely pernicious to the well-being of the tooth, destroying its vitality either more or less. Cobalt is the best and safest devitalizer of the pulp, and he advises its use. Dr. Spelman said the arsenious acid poisoned the blood and caused pericementitis.

Dr. Palmer exhibited some beautiful drawings and models of the mouth and teeth, giving the four divisions, according to his plan, with appropriate names for the fissures of all the teeth and the cusps, with indications for filling, to restore their beauty and strength.

This meeting was one of profit and pleasure, each member taking a lively interest in all the proceedings. H. L. Ambler, *Rec. Sec.*

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SPECIAL CIRCULAR TO PERSONS INTERESTED IN THE USE OF THE MICROSCOPE.

In making arrangements for the meeting of the American Association for the Advancement of Science, to be held at Salem, Mass., commencing at 10 A.M., August 18, 1869, the Local Committee, in order to give encouragement to the general and increasing interest in the use of the microscope, have decided to furnish rooms for the display and comparison of microscopes, objectives, accessory apparatus of all kinds, test objects, and objects of scientific and popular interest.

It is intended to have as complete a collection as possible of instruments of both American and foreign manufacture. Those who are possessed of microscope stands, objectives, or accessory apparatus in any way remarkable for excellence of performance or design, are requested to bring them to the meeting.

The objects of this exhibition will be to assist the progress of scientific research, by social intercourse and a full comparison and discussion of whatever is new and important in microscopical investigation, and to encourage the manufacture and use of this valuable instrument.

Arrangements have been made to give ample opportunity for the use of the microscopes both day and evening. A safe place has been secured for the deposit of instruments sent beforehand to the care of Mr. Bicknell, or brought by visitors who do not wish to keep them in their own possession.

A sub-committee has been appointed by the Local Committee to make the necessary arrangements. Further information relating to the subject can be had by addressing

Edwin Bicknell, *Sec'y of the Sub-committee,*
Peabody Academy of Science, Salem, Mass.

Salem, May 24, 1869.

BUFFALO DENTAL ASSOCIATION.

The fifth annual meeting of the above organization was held on Monday evening, June 7th, 1869, at Buffalo, N. Y. The following were elected officers for the ensuing year:

President.—Dr. B. T. Whitney.

Vice-President.—Dr. J. H. Giffing.

Secretary.—Dr. S. A. Freeman.

Treasurer.—Dr. T. G. Lewis.

Delegates to the American Dental Association.—Drs. G. C. Daboll, A. P. Southwick, T. G. Lewis, M. B. Straight.

The usual reports of officers were submitted,—an able address by the retiring President, Dr. G. C. Daboll, was delivered, and the business incident to the annual meeting acted upon. The affairs of the Association were shown to be in a prosperous condition, and augur well for the future prosperity of the profession of Buffalo.

S. A. Freeman, *Secretary.*

BUCKS COUNTY DENTAL ASSOCIATION.

A number of dentists of Bucks County, Pa., and vicinity, met at the office of Dr. J. S. Rhoads, in Doylestown, on the 7th of June, 1869, and, after a free interchange of views and sentiments, it was decided to form a dental society, under the name of "The Bucks County Dental Association."

The officers thereof for the ensuing year are:

President.—Dr. H. P. Yerkes.

Secretary.—G. W. Adams.

Treasurer.—J. W. Scarborough.

Executive Committee.—J. S. Rhoads, F. Swartzlander, and J. Hayhurst.

This Association meets semi-annually, on the first Monday in May and in November. Next meeting to be held at the Temperance Hotel in Newtown. Subject for discussion: "Taking Impressions."

G. W. Adams, *Secretary.*

BIBLIOGRAPHICAL.

Transactions of the American Dental Association for 1868.

These Transactions, embracing an account of the eighth annual meeting, held at Niagara Falls, July, 1868, has been received. In looking over the pages, it is surprising to find a number of most remarkable and inexcusable mistakes. In one portion, in particular, certain views advanced by the writer of this are *twice* reported, first on page 62, embrac-

ing a fair summary of what he intended to say, and on page 67 a most singular account is presented of what he certainly did not give utterance to. Again, on pages 133 and 134, Dr. Allen is reported as making remarks relative to interglobular spaces in dentine, which, in reality, were made by Dr. Latimer. A number of other mistakes of an equally inexcusable character are scattered throughout the work, which seriously impair the value of the Transactions. It is a matter of regret to be compelled to direct attention to these defects, recognizing that at the best the preparation of the Transactions for publication is a laborious and thankless task, and that, even with the greatest care, mistakes will sometimes occur. The publication of the Transactions is a responsibility, however, which should only be intrusted to, and accepted by those who have had an extended experience in superintending the publication of printed matter. Too much care cannot be exercised by the Association in the selection of such a committee, and no other consideration than the special fitness of parties to perform such duties should have any control in their selection. The estimate in which the Association will be held by other scientific bodies depends upon the character of the published Transactions. J. H. McQ.

CORRESPONDENCE.

MENDING PLASTER MODELS.

To the Editor of the Dental Cosmos:

Wax and resin, shellac varnish, and liquid silex are recommended for the above purpose; but neither, in my experience, can compare with sandarac varnish. Saturate the broken surface thoroughly, and press them well together. Allow it to dry, and the model will stand all the manipulation required. S. T. Clements, L.D.S.

DENTISTRY IN BERMUDA.

The following extract is presented from a letter received from Dr. W. C. Horne, of New York, on his return from a visit to the Bermuda Islands, under the impression that it would be of interest to the readers of the Dental Cosmos:

"A wish for a change of season and climate, and to revisit some of the scenes of my boyhood, led me to pass the winter in these very lovely islands. I was welcomed by many friends, among whom I was as fully occupied professionally as I desired to be. I found nothing to corroborate the view taken by some eminent authorities that Americans have the worst teeth in the world.

"The Bermudians are subject to all the dental maladies with which we have to contend in New York, requiring quite as much care and patience in their treatment. It fell to my lot to introduce nitrous

oxide in dental operations, my use of it being mainly supplementary to the reparation of those natural teeth which promised a successful issue. It had been previously made and inhaled; but had not, as I was credibly informed, been used for any surgical operation. Its administration was attended with the usual success; and it was hailed, as it deserved to be, as a great blessing."

AMERICAN DENTAL ASSOCIATION.

HARTFORD, CONNECTICUT, June 10th, 1869.

THE ninth annual meeting of the American Dental Association will be held at Saratoga Springs, N. Y., commencing Tuesday, August 2d, 1869, at ten o'clock A.M.

The following form of certificate was adopted at the last meeting of the Association:

"This certifies that —— —— was duly appointed a delegate to the American Dental Association on the —— day of ——, 18 —, by the Dental Society of ——, and that said —— —— is a dentist of good character and standing, and is at this time in regular practice."

No delegate will be admitted without he answers the requirements of this certificate, which he must bring with him and present in person.

Accommodations will be secured for those giving early notice to Dr. J. G. Ambler, No. 25 West Twenty-Third Street, New York City.

There is reason to anticipate a profitable and enjoyable session, and it is hoped that representatives from every local society in the United States will be present.

JAS. MCMANUS, *Cor. Secretary.*

SELECTIONS.

LAW CASE—NEW YORK COLLEGE OF DENTISTRY.

The Attorney-General *v.* The Dental College of New York—Supreme Court, Chambers—Cardozo, Justice.

"THIS was an action brought by the attorney-general, in the nature of a *quo warranto*, to forfeit the charter of the Dental College of New York on the ground of misbehavior of the trustees. The chief charges against them were: disregard of their own by-laws, attempting to alter those by-laws irregularly in order to cover up such irregularity, and giving diplomas to four students who were not, according to their regulations, entitled to such diplomas. There were beside some charges that officers of the College had used the provisions of the College, made for the charitable treatment of the poor, for their own gain. This, however, was not an essential point in the case. The main charge was the issuing of the certificates or diplomas to the young men at the last graduation. The purpose of the founders of the College seems, from their earlier rules, to have been to very largely increase the scientific requirements of dentists. Their first rules required three years' study from their students. This was afterward modified so as to permit office-

work to count as time of study, and thus to reduce the period of actual attendance at the College to two years or somewhat less. The charge is that, at the last examination, they passed some young men who had not filled even these easier requirements, and the regents of the University having refused to approve these diplomas, an effort was made, in a hurry and irregularly, to amend the by-laws to cover the case.

"The answer of the College is, that in so far as the faculty of the College did act, they acted on the representations of the dean, who has since failed to be re-elected, and is now the promoter of this attack; that as matter of fact, the young men were well prepared, and passed excellent examinations; that the trustees did not, in fact, issue diplomas, and have done nothing illegal, whatever they may have intended to do, and that their intentions were perfectly good.

"The case came up on a motion before Judge Cardozo, and, after argument, an injunction order was granted, and a receiver of the College appointed, as provisional remedies.

"A motion is now made for a reargument of the former motion and the vacation of the former orders, the defendant adding affidavits containing somewhat more full and technical denials of the charges, and the parties appeared by counsel before Judge Cardozo. Mr. Courtney, counsel for the plaintiff, commenced his argument, and continued for about ten minutes, when Judge Cardozo was called away from the bench. After waiting for his return, some ten or fifteen minutes, the counsel, after a short conversation, handed up their papers to the clerk and left the court-room. Mr. S. G. Courtney for plaintiff; Mr. Anthon for defendant."—(*N. Y. Tribune*, June 6.)

EXPLOSION OF VULCANIZER—ACCIDENT TO DR. P. H. GISH.

THE Janesville (Wis.) *Sun* gives the following report of the injury, progress, and prospects of Dr. Gish, as furnished by Dr. W. A. Harvey:

"On Saturday afternoon, April 24, Dr. Gish, of this city, dentist, received a severe injury of the head, under the following circumstances. He was standing near his vulcanizer, watching its action, when the boiler exploded, projecting the boiler cap of $2\frac{1}{2}$ pounds weight with tremendous force against his forehead, severely lacerating the integuments, commencing at the left eyebrow, and extending upwards to the top of the forehead, and fracturing the skull in a vertical direction $3\frac{1}{4}$ inches, and in a transverse direction on an average $1\frac{1}{4}$ inches, forcing the fragments down upon the brain, and under the sound portion of bone. The membranes of the brain were also perforated, and bled copiously. The patient was quickly brought under the influence of chloroform, and the wound enlarged by the knife in two directions, in order to facilitate the operation and the diagnosis of the case. All the fragments of bone, twenty in number, were readily removed except two. One of these had become imbedded in the membranes of the brain, under the sound bone, and was with some difficulty extracted. The other, embracing the bony ridge above the eye, and a portion of the thin plate separating the eyeball from the anterior lobe of the brain, had to be dissected out very carefully to prevent making a communication between the cavity of the brain and that of the eye. When the broken surface was cleared of bony fragments, it was found to be an opening of nearly four square inches, extending vertically

from the top of the forehead to about one inch within the roof of the orbit of the eye, a distance, in following the curve of the eyebrow, of three and one-half inches. By the removal of this orbital plate, a portion of the brain must hereafter lie in immediate contact with the eyeball, having no support *below*, and the eye none *above*. Through this large, unsightly opening, the brain projected like a distended bladder. Before the operation much hemorrhage occurred, requiring the ligation of several arteries. There were found also two other wounds penetrating to the skull, above the right eye. The wounds having been cleansed, were closed by sutures and straps; the patient was taken to his home, where he has been doing well, with no untoward symptoms to the present time, the tenth day after the injury.

"The patient was first seen after the injury by Dr. Judd, who sent for Dr. Barrows, and they in turn called Dr. Harvey, and requested him to perform the operation, which he did accordingly, assisted by these gentlemen.

"Four circumstances particularly complicate this case and diminish the chances of recovery. 1st. The penetration of the brain proper by rough fragments. 2d. The thin, rough edge of the orbital plate over which the anterior portion of the brain must hang, creating inflammation and probable abscess. 3d. The location of the injury, which, according to observation and the opinion of surgical authors, is dangerous in proportion as it approaches the anterior part of the head; the danger diminishing from before backwards; the forehead being the most dangerous of all. 4th. The large surface of brain deprived of bony covering.

"Usually, if the patient survives the result of extravasation of blood on the brain, after the operation, during the first forty-eight hours, he will not be particularly menaced again until inflammation arises, which generally in these cases is delayed to the tenth or even the twentieth day, and sometimes longer, and the patient cannot be said to be out of danger short of three or four months.

"From all the circumstances of this case, viewed in the light of surgical history, as made up in the Crimean war and our own rebellion, and the recollection of many cases treated in both civil and army practice, we are of the opinion that no very sanguine hopes of recovery can be entertained, considering the extensive character of the injury, and its unfortunate complications."

BOSTON DENTAL COLLEGE.—INTERESTING INJUNCTION CASE.

"JUDGE AMES issued an injunction on Saturday upon the officers of the Boston Dental College restraining them from granting the degree of Doctor of Dental Surgery to students of three years' pupilage who have not attended two full courses of lectures, said courses to cover two full years, as understood at Harvard and other medical and dental colleges. The injunction was issued at the instigation of six members of the Board of Trustees, viz.: John P. Ordway, Eben D. Jordan, Ammi Brown, I. M. Daly, Isaac Ayling and J. B. Coolidge. A hearing will be held on Saturday, June 19th, to see whether the injunction shall be made perpetual."*—*Boston Herald*, June 14.

* June 19th the injunction was made perpetual.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEO. J. ZIEGLER, M.D.

Biological Researches.—"Among the permanent benefits resulting to science from the late Paris Exhibition must be placed a series of very elaborate reports, published under the auspices of the Minister of Public Instruction, on the recent progress of the various departments of science in France. Two of the most valuable of these reports are those by Milne-Edwards on 'The Recent Progress of the Zoological Sciences,' and by Claude Bernard on 'The Recent Progress of General Physiology.'

"Milne-Edwards' Report consists of a brief historical introduction and four chapters treating respectively (1) of works relating to the multiplication and development of animals; (2) of works relating to the mode of organization of different animals, to their zoological characteristics, and to their laws of distribution; (3) of works relating to the history of the functions of the animal economy, and (4) of works relating to general zoology. Under the first of these heads the reporter gives an excellent sketch of the prolonged discussion on spontaneous generation that has disturbed the French physiologists, and, indeed, the scientific world at large, ever since Pouchet, in 1858, first propounded his heretical views on a point that was regarded as definitely settled by the experiments of Schulze in 1836. While fully admitting that M. Pasteur's rigorous experiments have quite settled the question, he adds that 'the ideas which have so ably been sustained by M. Pouchet are not abandoned by all physiologists; thus MM. Joly, Musset, and Meunier in France, M. Montegazza in Italy, Schaffhausen in Germany, Dr. Child in England, and Dr. Wyman in America,* consider themselves justified in maintaining that microscopic animalcules may, as it were, form themselves from their constituent parts and assume vitality without the intervention of a previously living being.' If, he adds, observers of such a class as these hold views directly opposed to those generally entertained, it is at all events expedient that the causes of such discrepancies should be investigated. One of the circumstances which may have led the partisans of spontaneous generation into error probably is the extreme power of resisting the destructive action of high temperature possessed by different minute organisms. Thus, M. Gavarret has found that tardigrades and rotifers which have been completely dried may be exposed to a temperature of 110° C. or 240° F. without their vitality being destroyed. The volvox (a well-known vegetable microscopic organism) possesses the same property, and while the pages of this Report were passing through the press M. Pouchet made the announcement that certain vegetable embryos had a far greater power of resisting the destructive action of heat than is generally supposed. Thus, the seeds of an American plant of the genus *Medicago* may be boiled for four hours without losing the faculty of germinating. As

* To these names may now be added those of Professors Owen and J. H. Bennett.

an illustration of the tenacity of life, we may also refer to the experiments of Davaine, who preserved alive for five years, in a weak solution of chromic acid, the eggs of an intestinal worm (*Ascaris lumbricus*) occurring in the common *Testudo græca.* Again, several observers have seen the Colpodæ and certain other infusoria evolving from their bodies a coagulable matter which solidifies round them and may protect them from external destructive influences; and further, it has been shown by M. Pasteur's researches that infusoria and their germs are capable of traversing bodies, such as mercury, which might be supposed to offer an insuperable obstacle to their passage. The last-named fact may serve to explain the recent curious experiments of M. Donné, who, on covering freshly-laid eggs with carded cotton so as to protect the shell from contact with atmospheric dust, and leaving only one small orifice in the envelop, found that, after a time, microscopic vegetations were developed in the interior of the eggs thus treated, and if a little water was introduced, animalcules in great numbers appeared. The same results follow if the egg has been hard boiled.

"The mode of origin of intestinal worms and other parasites infesting man and animals is next considered. The reporter somewhat ingeniously claims for a Frenchman, M. Felix Dujardin, one of the first discoveries in this direction, because his investigation in 1842 of the habits of *Mermis* led the way to the admirable researches of Siebold regarding the necessary migrations of the *Filaria* generally; and he all but maintains that Van Beneden, who gained one of the prizes offered by the Academy for the best essay on the development of the cestoid worms is a Frenchman, on the ground that Belgium is French in its language and in its scientific tendencies, as well as in its origin. Frankly enough, however, he associates with the name of Van Beneden those of Küchenmeister (of Zittau), Siebold (of Munich), and Leuckart (of Giessen), in regard to the grand discovery of the life-history of the tapeworm. The researches of Davaine and others on the presence of Bacteria, which appear to be the larvæ of some of the *Filaria* in the blood of the frog, rat, cat, dog, and man, are then noticed. In man their presence is associated with carbuncular disease, which may be spread from one individual to another by blood inoculations. The presence of these organisms in the blood of sheep is the cause of one of the diseases which are most fatal to this animal.

"The abstruse subjects of life and vital force are next considered. 'At first sight,' he observes, 'the motor power which animates all the parts of the living machine appears to be single and indivisible; but this conception of the life of an individual is obviously incompatible with many well-attested facts, and to comprehend many physiological phenomena of the greatest importance we must believe that every *organite* or anatomical element of which the animal body is composed possesses its own vitality.' How else can we explain that the tail of a lizard, which is separated from the body with great ease, will continue moving for several hours? or why do very small fragments of ciliated mucous membrane continue swimming about rapidly for more than a day? Such phenomena as these were formerly explained by supposing that a certain quantity of nervous force developed by the organs essential to the life of the individual and transmitted to the peripheral parts of the organism were in some way stored up in those parts, and consumed there after separation from the mass of the organism. The recent

observations of Vulpian, Bert, and others show that separated parts—as the tail of a lizard or of a tadpole—continue to execute movements for a considerable period, in consequence of their constituent tissues possessing a vitality of their own, which is independent of the general vitality of the organism collectively. In one experiment the amputated tail of a tadpole remained alive for nine days, and grew very perceptibly during that interval. Moreover, the healing of the stump at the seat of amputation affords evidence of the independent vitality of the tail. But as this animal fragment did not possess the physiological instruments necessary for carrying on its due nutrition, it perished after a time in the futile attempt, as Milne-Edwards observes, to convert itself, like a young polyp produced by scission, into a new and complete zoological individual.

"The singular experiments of grafting one part of a living animal into the body of another, commenced by John Hunter, and more recently carried on by Dr Bert, of Bordeaux, also show very distinctly that in the higher animals (mammals) as well as reptiles the anatomical elements possess a personal vitality independent of the general life of the organism to which they pertain. In one of his experiments Dr. Bert succeeded in engrafting into the back of a living rat the free extremity (of course with the skin removed) of the tail of another rat, which he had just amputated. The transplanted tail not only continued to live, but increased in size, 'and consequently possessed the faculty of organized crude materials (*la matière brute*), and of communicating to them the vital principle.' We may add—although the fact is not mentioned by the reporter—that this compound animal was well, and was made the subject of exhibition more than a year after the operation, and that after about six months the supplementary tail was found to be unquestionably sensitive.*

"Among other facts bearing upon and supporting the view that the different anatomical elements possess a personal life independent of the general life of the organism, may be mentioned the artificial production of osseous tissue by the engrafting of periosteum (a subject with which M. Ollier's name will be always associated), and the production of new nerve-tubes in a segment of the lingual nerve of a dog, introduced under the skin in the femoral region and allowed to remain there for six months. Evidence of a totally different nature is afforded by the beautiful researches of Claude Bernard on the action of curare (the South American arrow poison), which possesses the property of destroying one class of the anatomical elements while the other constituents continue to live. The nervous conductors which normally excite muscular contractions are killed, while the nervous centres from which they proceed and the muscles which they supply retain their physiological power. It is true that the general life of the individual is soon extinguished, but this is an indirect result consequent on the suspension of the necessary movements of respiration.† Those who wish to

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* Professor Bernard remarks (see page 174 of his Report), with regard to this reversed tail, that the fact of its first being insensible, then confusedly sensible, and finally normal in relation to sensibility, shows that its original nerves transmit the sensitive current in the opposite direction from that in which they transmitted it before the tail changed owners.

† As might be expected, Professor Bernard gives an excellent *résumé* of his numerous experiments on curare in his Report.

We may mention in reference to this subject that Vulpian is altogether opposed to Bernard's view that the motor nerves are alone affected. He believes that

pursue this subject further would do well to read Vulpian's lecture on 'Vital Force,' contained in the volume which was reviewed in this journal a year or two ago.

"The reproduction, development, and metamorphoses of animals are next considered, and as most of our knowledge on these subjects is of comparatively recent date, the report on their progress occupies upwards of forty pages. In this part of it are recorded the marvelous observations of M. de Quatrefages,* one of the reporters, on the mode of production of certain annelids (*Syllis* by De Quatrefages, and *Myrianida* by Milne-Edwards). The bodies of these animals are composed of segments or rings, whose number increases with their age. The new segments are always formed between the penultimate ring and the terminal segment. The process of reproduction is analogous to the reparative process by which a lost part is replaced in a lizard, but it is much more powerful; for in Myrianida the bud-like growth which is evolved from the penultimate ring soon becomes developed into an entirely new animal, and before the young individual thus produced separates from the parent stem, it similarly gives birth to a second infant worm, in front of the former one, which is thus thrust backwards. It is uncertain how often this process can be repeated, but in one of Milne-Edwards' figures a series of six young animals of different ages are seen attached to the parent, and arranged in order of primogeniture, the eldest one being next to the tail, and the youngest to the head of the mother. A similar case has been recently noticed in which, in an annelid of the genus *Terebella*, the reproductive faculty lay in one of the anterior segments. Modern French researches on comparative embryology are next considered, and the importance of the study of this subject in relation to classification is pointed out. But a history of embryology which excludes, in consequence of its plan, all reference to the names of De Baer, Rathke, Bischoff, Vogt, Kölliker, Löwen, Martin Barry, Nelson, and Agassiz, is obviously so gross an absurdity that the reporter, regretting doubtless the bonds by which he is restrained, has done the best that lay in his power, both here and elsewhere, to supplement his text by historical foot-notes regarding the labors of those physiologists who had not had the good fortune to have been born Frenchmen. The practical value of researches on the fecundation of some of the lower animals was recognized by De Quatrefages† in 1848, who pointed out that by artificial impregnation lakes and rivers in which the fish had been destroyed might be restocked; and, as all our readers know, pisciculture is now a widely extended branch of industry both in France and elsewhere.‡

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curare no more paralyzes the motor nerves than the sensory ones, and that the poison acts either directly on the muscles or on something intermediate between the muscular tissue and the motor branch. On this subject of dispute the reader may consult Vulpian's ninth and tenth lectures and the thirty-second note to Bernard's Report.

* See De Quatrefages' *Rambles of a Naturalist*, translated by E. C. Otté, vol. i. pp. 216–233, for a popular account of his singularly interesting observations on the reproduction of Syllis. These volumes and the same writer's *Metamorphoses of Animals* ought to be in the possession of every lover of natural history.

† The first idea of artificial fecundation is, however, due to a German naturalist, Jacobi, who nearly a century ago attempted to stock certain streams with trout by this means, but his attempts, although the experiments were published in France in 1773, were quite forgotten when De Quatrefages took up the subject.

‡ Milne-Edwards tells us that a complete history of pisciculture may be found in the recent work of Blanchard "On the Fresh-water Fishes of France," 1866.

"In his report on the progress of our knowledge regarding the metamorphoses of animals, he refers to the remarkable observations made in 1866 by M. A. Dumeril, Professor of Herpetology at the Paris Museum of Natural History. Having received a number of living axolotls from Mexico, he soon observed that they laid their eggs, like frogs and salamanders, after the latter had thrown off their branchiæ or gills. He obtained from these eggs a new generation of young axolotls, and was thus enabled to confirm the view which Sir E. Home (or more probably John Hunter) had suggested, that batrachians might exist which were capable of the act of reproduction while they still retained the tadpole form. But, in pursuing his investigations, he was led to a far more remarkable discovery than this. He ascertained that among the young axolotls born of parents provided with branchiæ, and resembling tadpoles, there were some which, after having lived for some time under this form, underwent the same metamorphoses as the frog goes through. Their branchiæ withered and disappeared, their general form was much altered, and, in place of their realizing the zoological type presented by their parents, they acquired the mode of organization presented by aquatic salamanders and the air-breathing batrachians generally, when they have arrived at their full development. It is at least equally remarkable that *all* the young axolotls did not undergo these metamorphoses, and most of these produced young which permanently retained their branchiæ, so that in the axolotl we have an animal capable of producing two distinct kinds of young, each of which is capable of multiplying, although their formations are so different that if their common origin were not known they would be considered as belonging not only to two distinct species, but to two different zoological families.* The reporter concludes his remarks on the metamorphoses of animals with a tribute of high praise to M. de Quatrefages for his interesting little book on that subject, an excellent translation of which was published a few years ago by Dr. Lawson.

"The methods by which the different constituent parts of animals are formed and increase in size are next considered. The investigations on the formation and growth of bone by Flourens, Brullé and Hugueny, Robin, and Alphonse Milne-Edwards (the son, we believe, of the reporter), are duly considered, as also are those of Guillot and of Robin and Magitot on the formation and evolution of the teeth and jaws, which in some respects differ from the generally accepted views of the late Professor Goodsir, than whom a more patient and accurate observer never existed. During recent times much additional knowledge has been gained regarding the mode of formation of the solid parts of those groups of the lower animals which were till lately confounded together as polypi. Among those who have specially distinguished themselves in this department must be mentioned Milne-Edwards himself (*Histoire Naturelle des Coralliares*, vol. i. 1857, and numerous Memoirs in the *Annales des Sciences Naturelles*), the late J. Haime, and Lacaze-Duthiers, whose *Histoire Naturelle du Corail* (1864) is one of the most interesting works on natural history that we ever read.

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* We see from the brief report of the proceedings of the Zoological Society, at their meeting on May 28, given in the *Athenæum* of June 6, 1868, that young axolotls have been hatched in this country, and that Dr. Günther, who exhibited them, "made remarks on the strange facts connected with the development of this animal."

"The chapter that we have been considering concludes with a sketch of the recent advances made in the study of teratology, or the doctrine of monstrosities. While the researches of the two St. Hilaires, of M. Serres, and others afforded evidence that deviations from the common law are not the results of chance, but are influenced by and subject to certain rules, the causes which occasioned these deviations and the mechanism by which they were induced remained almost totally unknown. With the view of eliciting further information on these mysterious points, the French Academy in 1859 offered one of their highest prizes for the best essay 'on the experimental study of the modifications which may be occasioned in the development of a vertebrated animal by the action of external causes.' The prize was equally divided between M. Dareste and M. Lereboullet, the former of the two studying the eggs of the common fowl, and the latter the eggs of the pike, which were selected in consequence of the transparency of their envelope and of the facility with which any number might be obtained by artificial fecundation. The observations of M. Lereboullet seem to have been confined to tracing certain early embryonic changes with the formation of double monsters, such as fish with one body and two heads, two bodies and a single tail, or a single head and two bodies; and, as he does not seem to have employed any external agencies to induce these embryonic changes, he can scarcely be considered as having complied with the demands of the prize question. M. Dareste, on the other hand, conducted his experiments with the main view of artificially producing monstrous chickens, and of studying the organic anomalies that may be induced by the influence of different disturbing causes. He constructed a very perfect artificial incubator, which answered all the purposes of sitting, and examined the effects produced by lowering the temperature at different periods of incubation, by applying to the shell solutions which rendered it impermeable to air, by variations of position of the egg, by the unequal heating of different parts of it, and by many other uncustomary conditions. He found that, when the disturbing force acted at the earliest stage, the number of monstrosities was much increased above the ordinary ratio; but if it was not applied until the development was somewhat advanced, no monstrosities were caused, but death often ensued. To a certain degree he could obtain a special anomaly at will. For example, by unequally heating different parts of the egg, he could produce a malformation of the blastoderma, and of the vascular area which acts as the transitory organ of respiration; and he always obtained dwarfs when the eggs were hatched at a higher temperature than that of normal incubation. He likewise discovered various connections between certain early embryonic anomalies and anomalies in more advanced life, as that anencephalia may be indirectly occasioned by an anæmic state of the blood, which gives rise to dropsy of the cerebral ventricles, and that inversion of the viscera commences with a modification of the primary state of the heart. It is deserving of record that this *savant* has devoted no less than ten years' continuous study to this subject."—(*Medical Times and Gazette.*)

Periodicity of the Corporeal Functions.—*The Lancet* gives the following abstract of a paper on this subject recently read in the Belgian Academy: "M. Spring first speaks of the blood, and observes that from the time of Cullen and Doubh it has been clearly

recognized that the heart and arteries present two ascending and two descending periods in the twenty-four hours. The first period of ascent commences at 3 A.M., and attains its maximum at 9 A.M. The second commences at 1 P.M., and culminates at 5 or 6 P.M., at which time, in disease, an augmentation of the fever occurs. The second maximum is higher than the first. In health, the difference between the maximum and the minimum is from ten to twenty pulsations per minute. The respiration varies with the circulation, so that there are two or three more inspirations per minute at 9 A.M. and 6 P.M., than at 3 A.M. and 1 P.M.; and it is to be noticed that, as shown by Vierordt's experiments, the excretion of water and of carbonic acid is in inverse proportion to the number of inspirations. In like manner, exact thermometrical observations have shown that the temperature of the body is lowest at midnight, and attains a first maximum at from 8 to 10 A.M.; while a second still more elevated temperature is reached toward 5 or 6 P.M. Some difference possibly exists in various latitudes, as Dr. W. Ogle's observations show that in London the cycle is single, the minimum being at 5 or 6 A.M., while the maximum occurs about 7 P.M. The limit of the variations is about three quarters of a degree cent. ($3\frac{1}{2}°$ Fahr., Ogle). It is noticeable that absorption takes place less actively in the descending periods of the pulse, respiration, and temperature, to which circumstance the more difficult digestibility of supper is attributable. Lastly, there is some, though still incomplete, evidence that the excreta—as water, urea, uric acid, sulphates and phosphates—are discharged in proportions confirming the view of a double semidiurnal cycle.

"Now, to what is this remarkable periodicity due? asks M. Spring. Some have referred it to the same category as the semidiurnal variations in the magnetic needle, and others to the similar variations observed in the ebb and flow of the tides; others, again, to the barometric changes of the air: but these phenomena scarcely bear on the subject in question. The needle, indeed, moves from the east to the west from 8 A.M. to 1 P.M., and from the west to the east from 1 P.M. to midnight; but it remains stationary through the night, and its revolution is therefore rather diurnal than semidiurnal. The tides again, though semidiurnal, far from coinciding with the hours of the maxima of the human circulation, are systematically retarded some fifty minutes per diem. The oscillations of the barometric pressure of the air are more in accord with the periodical phenomena of man; but while the first maximum is about 9 A.M., the second does not occur till nearly 12 P.M., and this is the highest of the two. Hence we must look for some other cause of the observed phenomena; and the difference which exists between the two semidiurnal maxima obliges us, M. Spring holds, to admit a peculiar diurnal periodicity proper to the human body, and capable of being represented by a wave which has only one daily minimum and one maximum, this coinciding with the semidiurnal maximum of the evening, and rendering it greater than that of the morning. According to Martin, the turgescence of the body diminishes at night and increases in the morning. The increased tightness of boots and clothes in the evening is well known; and numerous measurements have shown that the chest diminishes three-quarters of an inch during sleep. Besides these variations occurring at certain hours, there exists a diurnal balance or compensatory action, the effect of which is that whenever, from

any cause, the quantity of chemical work done in and by the blood is augmented during the day, it is spontaneously diminished in the night succeeding, and *vice versa;* so that the body returns again to its previous condition. Sometimes, however, the compensation is imperfect; and then two days are required to make up for previous losses, and we obtain a bidiurnal periodicity which was well shown in Voit and Bischoff's dog. Tridiurnal and septimanary periodical phenomena undoubtedly exist; and though little observed in health, they frequently become strongly pronounced in febrile disease.

"M. Spring then proceeds to consider periodicity as exemplified in the nervous system; and points out that our social habits, though capable of great variation to suit circumstances of our lives, are yet essentially governed by the laws of innervation,—of which the most prominent are the law of exhaustion and the law of habit: the former influencing in particular the time and duration of sleep, almost universally enjoyed during the night, and best during the early hours of the night; and the latter materially modifying many of our actions.

"Lastly, he refers to *plastic* periodicity: the phenomena seen in the series of acts of development, growth, maturity, decline, and death,—which epochs mark the grand periods of individual life, and are accompanied and indicated by specific changes, as the passage of the omphalo-mesenteric to the placental circulation, and thence to independent life, the first and second dentition, etc. Independently of these grand periods, which occur only once in the life of the individual, there are others less protracted, which are repeated with wonderful regularity,—of which in animals the period of moulting, and in man the quadri-septimanary periodical ovulation of the female, are the most striking instances."

Comparative Pathology.—"Notes on the Diseases of Animals in a State of Confinement. By S. M. Bradley, M.R.C.S., Lecturer on Comparative Anatomy at the Royal School of Medicine, Manchester.—So much light has been thrown upon human physiology by the study of comparative physiology and experiments *in corpore viri*, that we may reasonably expect that a proportionate increase of light will be thrown upon the knowledge of human pathology by the observation of the diseases which affect the lower animals. To be strictly accurate, it is perhaps the etiology of disease that is likely to be especially benefited by this study, as animal therapeutics at present are not in a highly satisfactory condition. My own observations have been limited to the animals that have suffered (and, I am able to add, as a rule have died) at the Bellevue Gardens. I have found that these animals, all in an artificial state of more or less close confinement, exhibit a remarkable tendency to develop certain diseases to which, so far as is known, they are not liable in a wild state, and which may consequently be regarded as the result of bad air and improper food. I propose very briefly alluding to some of those diseases, and for this purpose shall take the four great classes of vertebrata sequentially.

"Fishes.—The most interesting disease that affects captive fish is the development of a fungus upon the gills. The fungus, which commences upon the free edge of the branchiæ, increases in size until it completely blocks up the interval between the contiguous gills, and the fish so affected dies as completely choked as if it were burked. When examined microscopically, the fungus presents the appearance of beaded

cells, characteristic of low forms of vegetable life. The disease is contagious. Now, all this appears to me, not a curious point of merely fanciful interest, but a fact of some importance to the practical physician; for 'the opinion is gradually gaining ground that the malarious fevers of hot districts, yellow fever, dysentery, and cholera, are all caused by the action of different species of fungi and infusoria. In the late epidemic of fever in the Mauritius, fungi corresponding to those found in the Grand River were found in the intestinal canal.' The most common causes of death, however, among confined fish, are want of oxygen and want of light.

"Reptilia.—Tubercular disease occupies the first rank in importance and frequency of the ailments to which the reptilia are liable; and, as Dr. Crisp (who has paid more attention to the subject than any one else) has pointed out, the intestines, liver, spleen, and kidneys are more commonly affected than the lungs. The tubercular matter is generally very soft.

"Reptiles in confinement are also liable to a peculiar form of stomatitis. The parts about the mouth swell; there is a viscid discharge; the mucous membrane of the mouth and adjacent parts becomes ulcerated; it is eminently contagious, and, as a rule, fatal: altogether strongly reminding one of glanders in the horse. Although this disease may be occasionally tuberculous, I believe—and I base my belief on its evidently contagious character and occasional curability—that it is by no means invariably so.

"Birds.—One of the most striking diseases to which confined birds are liable is a rheumatic inflammation of the joints; the phalangeal articulations being the favorite sites of attack. Wading birds are more prone to this affection than any others, and this may probably be accounted for by the small amount of blood which circulates through their slender shanks, and the small power they consequently possess of resisting cold. The disease generally commences in winter, the joints, if not very much injured, frequently recovering themselves in summer. The affected joints swell; the limb becomes distorted; and if the disease goes on to any extent, the foot at last reminds one of nothing so forcibly as the hand of an old washerwoman badly affected with rheumatic arthritis. In a bad case, the phalanges at length rot off one by one, and the bird has at last to 'stump it' on its tarso-metatarsal bone. Some birds—and this applies especially to ducks and hens—are subject (as the result of close confinement and overfeeding) to fits of apoplexy, technically called 'megrims.' After death the brain is found gorged with blood, and occasionally there is cerebral hemorrhage.

"Taking birds *en masse*, it may be stated that pheasants and moor fowl bear confinement the worst; the raptorial birds (particularly the falconidæ) the best.

"Mammalia.—It becomes necessary now to specify the diseases of some of the different orders, instead of taking them all together.

"*Ruminantia.*—The diseases of ruminants have become of national importance, and have been so thoroughly investigated that it is not necessary for me to dwell upon them. Their liability to lung affections, epidemics of pleuro-pneumonia, etc. is remarkable. Sheep are very liable to the presence of acephalocysts in various organs; though it is certainly not at all clear that this tendency to hydatid formation is the result of confinement. In the College of Surgeons there are nine spe-

cimens of hydatids in the sheep, situated in the lungs, brain, bones, liver, mesentery, and kidney. It is the presence of the Cysticercus tenuicollis in the brain that makes sheep 'giddy'—giddy it may well be with such 'a bee in its bonnet.'

"Of the diseases of pachyderms I need say little, as their great representative, the horse, has met with ample justice at the hands of Youatt and Stonehenge. The hog is very liable to the mumps and the mange, and is more frequently the subject of tubercle than any other pachyderm. A female Asiatic elephant that I dissected last year, at Bellevue, died apparently from cystitis.

"*Rodentia.*—Rabbits, when kept in ill-ventilated hutches, are subject to a contagious and very fatal disease called the 'sniffles.' Its name is sufficiently characteristic of the disease.

"*Marsupialia.*—Kangaroos and opossums are, like all phytophagous animals, very subject to tubercular affections.

"*Carnivora.*—One of the most notable things to observe, in referring to this order, is their small liability to tubercular affections, as contrasted with vegetable feeders. They die from inflammatory diseases of the lungs and abdominal organs often enough, but comparatively rarely from tubercle. This remark, however, does not apply to the carnivora kept in menageries; here the intensely bad hygiene, the filthy air, and the constant exposure to wet and frequent changes of temperature, are sufficient to destroy the soundest constitution; and the carnivora so confined are very frequently the subjects of tubercle. The carnivora are also very liable to rickets and liver affections. Of six seals that have died at Bellevue within the last year, I found abscesses of the liver in five cases. This may possibly be partially accounted for by the too frequent and unnatural feeding they undergo in a state of confinement.

"*Quadrumana.*—Every one knows that monkeys are exceedingly prone to tubercular affections. This fact seems to me not merely attributable to climatic influences (powerful though they undoubtedly be), for caged monkeys die almost as freely in hot climates as in cold; nor is it the result of rebreathing a polluted atmosphere, or an unsuitable diet, for in many gardens—notably those at Amsterdam, the Jardin des Plantes, and Regent's Park—everything wise is done in the way of food and ventilation. I cannot but think that the immoral habits of monkeys are in a great measure the cause of their great mortality. Lemurs are very subject to cataract, sometimes affecting one eye, more commonly destroying both. Monkeys are also liable to venereal affections. I have several times seen them suffering from gonorrhœa, and in one or two cases have seen what I believe to be a genuine chancre. I hope ere long to again find a victim afflicted with an ulcer of this description. In such case I shall not fail to inoculate him, and so, perhaps, be enabled to finally determine whether the disease may be produced *de novo* by dirty communication."—(*The Lancet.*)

"*Virulent Corpuscles.*—M. Chauveau, the indefatigable veterinary pathologist, has just placed before the Academy of Sciences of Paris a paper wherein he gives full details of the manipulations by which he succeeds in separating virulent corpuscles from the serum, or menstruum, in which they float. He succeeded in isolating such corpuscles from the pus of a pulmonary abscess affecting a horse suffering from glanders.

The author transferred the corpuscles to distilled water, inoculated the latter to two animals, and they soon perished with glanders. It would be worth trying whether carbolic acid would not destroy the activity of the corpuscles."—(*Ibid.*)

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"*Unilateral Hyperæmia in Hemiplegia.* By T. Henry Green, M.D., Lond., M.R.C.P., Lecturer on Pathology at Charing Cross Hospital.—It is now well known that, in hemiplegia, cases are occasionally met with in which the temperature of the paralyzed limbs is higher than that of those which are not paralyzed. M. Gubler was one of the first to draw attention to this in 1856. He says that this elevation of temperature is accompanied by hyperæmia, which may declare itself by the occurrence of catarrh, excessive flow of saliva, increased action of the skin, or hypersecretion of the axillary glands, on the paralyzed side. In one case he found that the saliva of the affected side was alkaline, while that of the opposite side was acid. Dr. Brown-Séquard, in 1863 observed, in a case of hemiplegia, dilatation of the vessels, elevation of temperature, increased action of the skin, and hemicrania, all limited to the paralyzed side. M. Chevallier during the past year published some most careful thermometrical observations on five or six cases of hemiplegia. In one of these there was a difference of 2·30° cent. between the two sides. In another case the return of power was accompanied by a corresponding return of the temperature to the normal standard, the parts falling in temperature in the same order in which they regained their power; that is to say, the temperature of the two lower extremities became equal first, then that of the two sides of the trunk, then the two upper extremities, and, lastly, the two sides of the face."—(*British Med. Jour.* and *Quar. Jour. Psychological Med.*)

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"*Salivary Calculi.*—M. Paulet, at the Imperial Society of Surgery, exhibited two salivary calculi which he found in Wharton's duct, in a patient affected with a purulent discharge issuing from the floor of the mouth. The calculi were in the duct of the left side, and M. Paulet extracted them by excision. He ascertained that the submaxillary glands of both sides were stuffed with calculi. These stones are not rare in Wharton's duct; as M. Paulet has collected 65 cases of them, while the foregoing is the only instance in which he is cognizant of their presence in the submaxillary glands themselves. M. Panar, however, presented a salivary calculus, which he had extracted by excision from the submaxillary gland. In this case pus was seen issuing from the open orifice of Wharton's duct. M. Desormeaux remarked that he had once extracted a stone *from Stenon's duct.*"—(*L'Union Médicale* and *Boston Med. and Surg. Journ.*)

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Cleft Palate completely closed by Operation.—At the late annual meeting of the Massachusetts Medical Society (*Boston Med. and Surg. Jour.*), "Dr. Bigelow exhibited a severe case of cleft palate successfully operated on. The fissure extended through the soft and bony palate, separating the median incisors. By stripping the soft tissues from the bony roof of the mouth, after the method of Langenbeck, he had been enabled to close the fissure completely. Silver sutures and a hard rubber shield had been employed to assist cicatrization. Dr. Bigelow also

exhibited the peculiar instruments used in this operation, including the gag by which the operation is now performed under ether and in young children."

Rudimentary Jaw and Teeth in Ovarian Tumor.—Dr. Kimball, of Lowell, exhibited (*Ibid.*) "an ovarian tumor which had been successfully excised a day or two previously from a young woman aged 31. The peculiarity of the tumor consisted in its containing a rudimentary lower jaw with rudimentary teeth. The lining of the tumor was covered with osseous scales, the whole weighing twenty-five pounds."

"*Brittleness of Bones.*—(*Les Mondes.*)—Professor Hofmann, at Prague, has recently analyzed bones of cattle, some of which were derived from healthy animals; others, again, from animals which during life had been affected with fracture of bones consequent upon their great brittleness. While the composition of the former was normal, that of the latter proved to be abnormal, by containing a far greater proportion of carbonates and phosphates of lime and magnesia, while, at the same time, the nitrogen contained in the organic matter of the bone was considerably less than it should be; hence the professor advised that, as a remedy in such cases, food richer in nitrogenous substances should be administered to the cattle."—(*Chem. News.*)

Natural Suppression of Hemorrhage from Divided Arteries.—Dr. Geo. A. Peters gives the following notes upon this subject in a long and elaborate essay on acupressure in the *New York Med. Jour.* for June. "Dr. J. F. D. Jones, an English surgeon, instituted a series of experiments on the lower animals to determine the manner in which hemorrhage was checked by Nature and by the ligature. The result of these experiments was first made public in a volume published in London in the year 1805, which established these facts, viz.: when an artery is divided, we have, first, a spirt of blood; then quickly following this a retraction of the artery within its sheath, and a contraction of its extremity. As the connective tissue between the vessel and its sheath is very loose, it is readily stretched and torn, leaving the internal surface of the sheath uneven; the blood becomes entangled as it flows, and 'thus the foundation is laid for the formation of a coagulum at the mouth of the artery, and which appears to be completed by the blood, as it passes through this canal of the sheath, gradually adhering and coagulating around its internal surface till it completely fills it up from the circumference to the centre.' This forms the external coagulum, and it is the first complete obstacle to the continuation of bleeding.

"The blood just within the mouth of the artery is now at rest, and, if there be no collateral branch given off very near it, a slender conical coagulum is formed, attached only by the circumference of its base, near the cut extremity of the vessel. This is called by Dr. Jones the internal coagulum.

"The artery, being itself highly organized, 'inflames at its cut end, and by the usual processes of repair the effused fibrin between the internal and external coagula adheres to them, and is firmly united to the internal coat of the vessel.' There is also a gradual contraction at the

end of the artery, and an effusion of fibrin between the tunics of the artery and into the surrounding tissues, causing them to become thickened and intimately incorporated with each other."

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Skin Converted into Leather.—"Mr. John Martin suggests, in the *British Medical Journal*, that external pressure by bandages, strips of adhesive plaster, etc., may in many instances be supplanted by the conversion of the cuticle into leather. A saturated solution of tannin applied to the skin, combines with the gelatin of the skin, before reaching the vessels, 'forming a contracted, impermeable layer of tannate of gelatin; it, in short, tans, or converts into leather, the superficial layer of the cuticle.' He adds: 'There are three points which must be attended to in using this remedy. *Cold water must be employed*, otherwise a solution of pyrogallic acid is used, not of tannin. *The solution must be quite recent*, and prepared in small quantities at a time; and the *tannin employed must be perfectly fresh*, for, unfortunately, tannin remains but a short time exposed to the atmosphere without being converted into gallic acid.'"—(*Medical Gazette.*)

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"*Parchment for Hermetically Covering Stoppers.*—Animal membrane is employed for hermetically sealing corks and bottles. Before using it, it is necessary to soak it in water to destroy its brittleness, and render it soft and elastic. Dr. Vogel recommends glycerin as a substitute for water. For this purpose he puts the bladder into a suitable dish, and completely covers it with glycerin, and leaving it for a few hours, or better still, for a few days, it thus becomes perfectly soft and elastic. After draining off, and pressing out the glycerin, the membrane is in condition for use. This method has great advantage over softening with water, as the bladder remains permanently elastic, whereas after the soaking in water it becomes hard and brittle. It is also more tight, as moist membrane has far less diffusive or dialyzing property than the dry. When the parchment is rendered soft by water there is great danger of its beginning to putrefy, and this difficulty is also avoided by the use of glycerin."—(*Journal of Applied Chemistry.*)

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"*Carbolic Acid as a Preservative.*—Allusion was made in the last number of the *Journal* to the use of carbolic acid and glycerin as a substitute for alcohol in preserving animals and morbid anatomical specimens. The remark has led to many inquiries regarding the method of employing it for these purposes. A mixture of equal parts of good commercial glycerin and water, to every gallon of which is added one ounce of the crystals of carbolic acid, constitutes a good preserving liquid for all animal substances. The use of pure glycerin, with about one-half pint of alcohol, and half an ounce of carbolic acid added to each gallon, makes an excellent mixture for preserving the tissues of soft animals, where it is important to preserve the *color*, as well as the tissues."—(*Boston Journal of Chemistry.*)

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Camphor to expel Mosquitoes.—"A writer in a South Carolina paper says: 'I have tried the following, and find it works like a charm. Take of gum camphor a piece about one-third the size of an egg, and

evaporate it by placing it in a tin vessel, and holding it over a lamp or candle, taking care that it does not ignite The smoke will soon fill the room, and expel the mosquitoes. One night I was terribly annoyed by them, when I thought of and tried the above, after which I never saw nor heard them that night, and the next morning there was not one to be found in the room, though the window had been left open all night.'"—(*Boston Journal of Chemistry.*)

"*Mineral Caoutchouc.*—Recent communications from Adelaide, South Australia, have made known the discovery in the southern portion of the colony of a remarkable carboniferous substance, which hitherto has only been found in small quantity in the coal strata of Derbyshire (England). It is a mineral caoutchouc, so called from its general appearance and elasticity. In Australia it is found on the surface of the sandy soil, through which it would appear to exude from beneath, as, burnt off occasionally by the bush fires, it is again found after the winter season, occurring in quantity and of varying thickness. Analysis proves it to yield 82 per cent. or more of a pure hydrocarbon oil; its value for the manufacture of gas there will be great, and it is also believed to be applicable to the making of certain dyes. The discovery is also important from its indication of the existence of oils or other carboniferous deposits. This material, known in mineralogy as elaterite, is also found in a coal pit at Montrelais, near Nantes, France, at Neufchâtel, and on the Island of Zante. According to the analyses of the late Professor Johnston, of Durham University, it is a hydrocarbon, containing from 83·7 to 85·5 per cent. of carbon, and from 12·5 to 13·28 per cent. of hydrogen. The variety found in Derbyshire (near Castleton) has a specific gravity varying between 0·9053 to 1·233; the substance is highly inflammable, its color blackish-brown, its lustre resinous."—(*Mining Journal* and *Chem. News.*)

Natural Counterfeits of Gold.—"The student should carefully examine all specimens with a magnifying glass, but must be particularly on his guard against three substances which bear a great resemblance to gold, and are frequently mistaken for it. *Iron pyrites* is the great misleader of the inexperienced eye, and many unfortunate and ludicrous mistakes occur regarding it. Pyrites may be readily distinguished from gold by its superior hardness, as demonstrated by attempting to scratch it with a knife; gold is readily cut, but pyrites resists the steel, or at most, flies off in gritty pieces; a particle on being heated with nitric acid will quickly dissolve, giving off red fumes of nitrous acid,—gold will remain unaffected. The second substance liable to be mistaken for gold, is copper pyrites; this may be detected by its solubility in nitric acid, and its loss of lustre when heated in the blow-pipe flame. *Mica* is the third substance, and in fine spangles it is very deceptive. By wetting the specimen the mica is dimmed and loses color, but the gold appears to better advantage. It may also be distinguished by its weight, which is only about one-sixth that of gold. Mica resists the action of nitric acid, a fact which must be borne in mind."—(*Canadian Pharmaceutical Jour.* and *Journal of Applied Chemistry.*)

"*Electro-plating Paper or other Fibrous Material.*—A mode has been devised for depositing copper, silver or gold, by the electric process, upon paper or any other fibrous material. This is accomplished by first rendering the paper a good conductor of electricity, without coating it with any material which will peel off. One of the best methods is to take a solution of nitrate of silver, pour in liquid ammonia till the precipitate formed at first is entirely dissolved again; then place the paper, silk, or muslin, for one or two hours in this solution. After taking it out and drying well, it is exposed to a current of hydrogen gas, by which operation the silver is reduced to a metallic state, and the material becomes so good a conductor of electricity that it may be electro-plated with copper, silver, or gold in the usual manner. Material prepared in this manner may be employed for various useful and ornamental purposes."—(*Druggists' Circular.*)

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"*Momentary Molecular Change in Iron Wire.*—Mr. Gore, F.R.S., while making some experiments on heating strained iron to redness by means of voltaic electricity, observed that, on disconnecting the battery and allowing the wire to cool, during the process of cooling the wire suddenly elongated, and then gradually shortened until it became quite cold. The amount of elongation of the wire during the momentary molecular change was usually about 1-240th part of the length of the heated wire; the molecular change evidently includes a diminution of cohesion at a particular temperature during the process of cooling, and it is interesting to notice that at the same temperature during the heating process no such loss of cohesion nor any increase of cohesion takes place; a certain temperature and strain are therefore not alone sufficient to produce it, but the condition of cooling must also be included. A large number of experiments were made with great care with wires of palladium, platinum, gold, silver, copper, lead, tin, cadmium, zinc, brass, German-silver, aluminium, and magnesium, but in no instance could a similar molecular change to that observed in iron be detected. This molecular change would probably be found to exist in large masses of wrought-iron as well as in small specimens of wire, and would come into operation in various cases where those masses are subjected to the conjoint influence of heat and strain, and in various engineering operations."—(*Chemical News.*)

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Mica a bad Conductor of Heat.—"Mica is known to be one of the worst conductors of heat we are acquainted with. For this reason mica powder is to be strongly recommended for filling in the walls of fire-proof safes. Any one wishing to assure himself of its value for this purpose can do so by taking a cast-iron tube 2 inches or 3 inches in diameter, placing a roll of paper in the centre, filling up the space between the paper and the walls of the tube with the mica powder, and, after well closing the ends, throwing it into a furnace and keeping it red hot for some time. When the tube is reopened after this the paper will be found quite uninjured by the heat—at least so says a writer in *Dingler's Polytechnic Journal*, and we see no reason to doubt his word."—(*Druggists' Circular.*)

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"'*Melene*' *as a Lubricator.*—An insuperable difficulty attending the use of ordinary lubricators, is their decomposition at high temperatures, leaving behind a thick viscid coating, which, especially in cylinders, interferes considerably with the motion it should assist. Ericsson's hot-air engine is especially difficult to lubricate, from this cause. The use of *melene* is advised for this purpose; it being a substance obtained from the paraffines, insoluble in water, soluble in the fixed oils, volatile without decomposition, not boiling under 370°, of the consistency of wax at ordinary temperatures, and floating on the surface of cold water. It is cheap enough to be used on a large scale, and preserves from oxidation and adhesion."—(*American Artisan.*)

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"*Reduction of Earthy Metals.*—The learned Abbé Moigno, while referring to this subject in *Les Mondes*, says: 'Our readers will undoubtedly learn with pleasure that the production of oxygen in cheap manner from manganate of potassa and of pure hydrogen, by means of a hydro-carbon fuel (*combustible hydrocarboné*), on the large scale, has become a decided success; that, moreover, the reduction of the earths baryta, magnesia, and alumina to the metals barium, magnesium, and aluminium, by means of hydrogen under high pressure and a very high temperature, is successfully carried out; while, lastly, M. Caron has succeeded in obtaining, by means of great perseverance, zircon-magnesia cones, which, instead of being very breakable and only lasting for a few nights, are fit for use for any length of time.' "—(*Chemical News.*)

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"*Researches on Materials fit for Resisting very High Temperatures.*—M. Audouin.—(*Cosmos.*)—While engaged with other studies on geology in the southern parts of France, the author found that between Tarascon and Antibes there exists a very valuable and extensive bed of bauxite (hydrate of alumina), which is occasionally applied for the manufacture of sulphate of alumina. This material has been applied, at the suggestion of Audouin, for the manufacture of crucibles and fire-bricks; and on having been tested in comparison with the best products of the kind from France, England, and Germany, it was found that even the best fire-bricks might be melted in bauxite-made crucibles heated by mineral oils and a blast."—(*Ibid.*)

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"*A New Cement.*—The following directions are given for making cement impermeable by air and steam, which is said to be superior to any in use for steam and gas pipes: six parts of finely powdered graphite, three parts of slaked lime, and eight parts of sulphate, are mixed with seven parts of boiled oil. The mass must be well kneaded until the mixture is perfect."—(*Druggists' Circular.*)

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"*To soften Putty.*—To remove old putty from broken windows, dip a small brush in nitric or muriatic acid (obtainable at any druggist's), and with it anoint or paint over the dry putty that adheres to the broken glass and frames of your windows; after an hour's interval, the putty will have become so soft as to be easily removable."—(*Ibid.*)

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, AUGUST, 1869. No. 8.

ORIGINAL COMMUNICATIONS.

REVIEW OF CONTRIBUTIONS TO ODONTOLOGY.

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(Continued from page 341.)

IT is my intention to present a series of extracts from the recorded observations of these eminent investigators (many of which are inaccessible to the vast majority of readers), so that step by step the evidence may be presented of the gradual evolution of the views at present entertained in relation to dental histology, and thus, perhaps, succeed in stimulating others to work in this direction.

The impulse in this new field of labor originated in the active, restless, inquiring German minds which have done so much for the advancement of science during the past half century. First among these should be named Prof. Arnold, who published an essay on the development of the teeth in the *Salzburg Med. Zeitung*, 1831, in which he says: "In an embryo of the ninth week we may perceive in both jaws, on the projecting edges of the gums, a proportionally pretty deep furrow, with ten depressions in it; a little later we may see a flat surface, on which there are many openings, communicating with small sacs, into which fine bristles may be passed. At the third month the sacs of the second molars may be seen communicating with the cavity of the mouth by small holes. The openings of the remaining sacs are soon closed by the mucous membrane of the mouth."

Raschkow, in an inaugural dissertation, "*Meletemata Circa Mammalium Dentium Evolutionem*," published in 1835, says: "Our own investigations by no means allow us to adopt the opinion of Arnold, for we have never been able to see, either in the human fœtus, or in other animals, any such apertures. We have examined with this object the fœtuses of calves and sheep, but we never saw the mucous membrane of the mouth dip into the alveolar groove; and in the grooves themselves

we never discovered the deeper recesses which Arnold describes. It was always, on the contrary, clear to us that the dental follicle, at its origin, is altogether separate from the gum, and is not closely attached to it by any intermediate connection. Serres and Burdach were also in error when they said that the dental germ was a continuation of the nerve; for we have shown above, that at its commencement neither nerves nor vessels are to be seen in it."

Raschkow made the mistake of drawing his conclusions from the examination of fœtal calves and sheep, and applying them to the human embryo, which an examination of the latter would have corrected. Arnold's researches were subsequently confirmed by Goodsir, who, in addition, carried his investigations still further.

Prof. J. Purkinje is evidently entitled to priority as a pioneer in the use of the microscope in the examination of the dental tissues. His researches in this direction were first given to the world by one of his students, V. Frænkel, in an essay, "*De Penitiori Dentium Humanorum Structura Observationes.*" For the views advanced by him and Retzius, which will now be presented to you, I am under obligations to the rare and valuable work of Nasmyth.

He fully recognized the characteristic difference between enamel, dentine, and cementum, and the analogy between the latter and bone, due to the presence, in each, of the *lacunæ*, or, as he erroneously regarded them, *corpuscles* or bodies, and which, he being their discoverer, were for years called after him, *Corpuscles of Purkinje*, until the error of interpretation was recognized and corrected. The presence of this structure on the roots of the human teeth, and the crowns of the teeth of several animals, was duly noted by him. The dentine (not so named at that time) he observed was composed of "a structureless (*structurlos*) substance, and of fibres passing through it. These latter run in parallel lines from the outer to the inner surface of the tooth, obliquely in some places, straight in others. * * * Though they are very thickly placed, still the structureless intermediate substance forms the greater part of the mass of the tooth. * * * These fibres are tubular, and in the teeth of the horse, at any rate, they are capable of absorbing ink by capillary attraction." The enamel Purkinje regarded as consisting "of simple perpendicularly-placed fibres, increasing somewhat in size toward their upper extremity, forming *quadrilateral prisms*, and often making several curves on one and the same level. These fibres are adherent to lamellæ, which run transversely around the tooth, and generally rest obliquely on the surface of the dental substance. The interior of the roots of old teeth consists, not of dental substance, but of bone, properly so called, as does also the deposit on the external surface of the root."

While advancing some views which subsequent observations on the part of others have modified and corrected, it will be noticed that in the main Purkinje's statements have been confirmed.

Johannes Müller, the eminent physiologist, following the lead of Purkinje, recognized that the dental fibres were tubular, but advanced the idea that they were "filled with inorganic calcareous salts. * * * In breaking fine sections of teeth perpendicularly to the fibres, he had frequently seen the latter projecting a little at the fractured edge. * * * In such cases they are quite straight, and not curved, and seem to be not at all flexible."

Prof. Retzius published the results of his observations in a work entitled "*Mikroskopiska undersokningar öfver Tandernes Särdeles Tandbenets, Strucktur.* Stockholm, 1837.

Nasmyth says of Retzius, that "he first examined the cartilage in teeth which had been macerated in diluted muriatic acid, and found, on making sections of it, that it appeared to consist of slightly undulating fibres lying close together, resting with one extremity against the cavity of the pulp, while the other terminated near the surface of the tooth. It was not till a subsequent period, he says, that he discovered that these were hollow, but in the mean time he observed no internal similarity between this cartilage and that of bone. He next procured, with the aid of a file, slices of tooth-bone as thin as writing-paper; increased their transparency by means of olive-oil and turpentine varnish; and found, on examining them under the microscope, that they were composed not merely of hollow fibres, but of ramifying tubes, of which the trunks open into the cavity of the tooth, supporting themselves on its pulp, while their terminations, in the form of extremely fine branches, run toward the external surface of the tooth. * * * Under reflected light, and on a dark ground, all these tubes seemed to contain a white matter. The enamel he found to consist of *hexagonal* solid prisms, on which were generally observed transverse lines or streaks, making them appear as if they were formed of several pieces, lying one above the other. * * * Round the roots and necks of teeth he found a structure presenting some similarity to osseous substance, from the small cavities it contained, * * * and from the number of winding, anastomosing tubes, as well as other large canals, opening into these cavities." Retzius observed that the tubes in the dentine do not run perfectly straight, but make a number of curves; he regarded them as "not merely hollowed out of the substance of the tooth, but as true canals, having their own walls." * * * With respect to the contents of the canals, he agreed with Prof. Müller, "that they consisted of an inorganic or earthy substance." His observations were not confined to the teeth of man, but in addition, those of a large number of animals were subjected to careful examinations.

Passing from the Continent to England, we find, shortly after this, three diligent and laborious observers coming forward almost simultaneously with contributions to Odontology, which have given to their

names a justly world-wide celebrity. I allude to Tomes, Owen, and Nasmyth. They have been named in this order for the following reasons, given by Tomes:

"Late in the year 1837, prior to the appearance, in this country, of the works either of Purkinje or Retzius, I commenced the investigations of the structure of the teeth, under the impression that little or nothing was known upon the subject. * * * After I had worked up the subject so far as human teeth were concerned, and examined the teeth of all the common animals, I became acquainted with Prof. Owen, who, after examining many of my preparations, and accepting a few, mentioned, in his lecture at the College of Surgeons, 1838, my researches in terms of great commendation, as having confirmed those of the Continental anatomists, and in some points extended further than they. I drew up an account of my researches in a paper entitled 'On the Structure of the Teeth, the Vascularity of those Organs, and their Relations to Bone,' which was read before the Royal Society, June 21, 1838, having been presented by Thomas Bell, Esq. This was the first account written upon the structure of the teeth in this country; and in addition to the confirmation of Purkinje's and Retzius' views, it contained several new points. The most important of these was the vascularity of the tubular structure."

"At a later date, in the same year, Prof. Owen read a paper on the structure of the teeth before the British Association. Shortly afterward Mr. Nasmyth published a work on the same subject."

I have given this account in full, as an act of justice to an eminent fellow-practitioner, who, although preceding his confrères in the presentation of the essay referred to, was in turn anticipated by them in the publication of extended treatises on this important department of science.

Prof. J. Goodsir about this time published his essay on the "Development of the Teeth," in the *Edinburgh Med. and Surgical Journal*, Jan. 1839, in which he carefully describes the development of the teeth during the three stages, follicular, sacular, and eruptive. This celebrated treatise has been so universally quoted by authors that his views are well known. He does not appear to have employed the microscope in these investigations.

Alexander Nasmyth, F.L.S., in 1839 published a work entitled "Researches on the Development, Structure, and Diseases of the Teeth," presenting at considerable length a historical introductory, embracing the researches of Purkinje and Retzius, and his own observations and conclusions at that time. Although agreeing in the main with these observers, he says: "The evidence in favor of the existence of a *system of ramifying tubes* in dental bone or ivory requires much further examination and corroboration, before we can be justified in adopting a theory tending to overthrow many received opinions, results

of ordinary experience." In a posthumous work, published in 1849, he asserts that "the so-called tube is a solid fibre." Further reference to this last work would be anticipating matters, as the character of its contents demands attention after other works which preceded it. Returning, therefore, to the one under consideration, we find the following: "Retzius states that only three substances enter into the composition of the teeth in their various forms, viz.: ivory, enamel, and cement; but I think that a fourth ought to be added to this list, viz., a structure having the appearance of ossified pulp, in which the vessels seem to retain their original position, but are found in a state of atrophy, intermingled occasionally with irregularly-formed ivory. This substance may be considered as constant as any of the other three; it constitutes almost exclusively the simplest teeth, as those of the ornithorynchus, anarrhichas, lupus, etc., and it is occasionally found to enter into the composition of the teeth of almost every animal."

(To be continued.)

PHOTO-MICROGRAPHY APPLIED TO CLASS DEMONSTRATIONS.

Synopsis of a Lecture delivered before the Biological and Microscopical Section of the Academy of Natural Sciences of Philadelphia.

BY J. J. WOODWARD, M.D.,

ASSISTANT SURGEON AND BREVET LIEUTENANT-COLONEL UNITED STATES ARMY, IN CHARGE OF THE MEDICAL SECTION ARMY MEDICAL MUSEUM, ETC.

On Monday evening, May 31st, 1869, this gentleman, in response to an invitation of the above Section of the Academy, exhibited specimens and gave a short description of the method of working out this interesting subject, as practiced under his supervision at the Army Medical Museum, Washington, D. C.

The Hall of the College of Physicians, in this city, which, with the usual courtesy and kindness of scientific bodies, had been placed at the disposal of the Section, was filled with gentlemen who take a lively interest in microscopy.

The lecturer, after stating that it was found to be impracticable, if not impossible, to exhibit, with any satisfactory degree of correctness, to a large class or assemblage, such microscopical preparations as require the use of high powers, even though aided by the oxyhydrogen or other powerful lights, explained how his attention came to be given to photo-micrography.

The great field promised by the pursuit of this branch of microscopy had already induced some to make attempts, among whom may be mentioned Donné, Prof. Gerlach, of Erlangen; Joseph Albert, of Munich; and Dr. R. L. Maddox, of Southampton, which proved that great usefulness could be claimed for the method.

In America, Prof. O. N. Rood,* of Columbia College, Mr. Lewis M. Rutherfurd, of New York, and Dr. John Dean, of Boston, must be mentioned; the latter having illustrated a paper on the spinal cord by photo-micrographs reproduced by photo-lithography, the magnifying powers not exceeding ten or twelve diameters, while both the former gentlemen had experimented with very high powers.

Mr. Rutherfurd had published a paper upon Astronomical Photography,† which contained many suggestions that the lecturer took advantage of; and, after an interview with that gentleman, in which the plan of constructing the objective, the use of the ammonio-sulphate of copper, and the substitution of a properly constructed concave for the eye-piece, were discussed, he determined to develop these suggestions, and assigned to Assistant Surgeon and Brevet Major Edward Curtis, U. S. A., the duty of carrying out the manipulations; to this gentleman he expressed his indebtedness for the successful issue of the experiments. The results attained were admitted by Dr. Maddox, who is one of the most successful laborers in this direction in Europe, and by other European savans, as most satisfactory, excelling anything heretofore done in this branch.

To obtain successful photo-micrographs the following principles are involved:

1. To use objectives so corrected as to bring the actinic ray to a focus.

2. To illuminate by direct sunlight passed through a solution of ammonio-sulphate of copper, which excludes practically all but the actinic extremity of the spectrum.

3. Where it is desired to increase the power of any objective, to use a properly constructed achromatic concave instead of an eye-piece.

4. To focus on plate-glass with a focussing glass, instead of on ground glass.

5. With high powers to use a heliostat to preserve steady illumination.

6. Where an object exhibits interference phenomena when illuminated with parallel rays, as is the case with certain diatoms and many of the soft tissues, to produce a proper diffusion of the rays by the interposition of one or more plates of ground glass in the illuminating pencil.

The manipulations are made in a dark room, or rather one faintly illumined by yellow light; the light used in the process of photographing being admitted by a small brass tube, and is obtained from a mirror, which reflects the rays of the sun from a Silbermann's helio-

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* On the Practical Application of Photography to the Microscope. By Prof. O. N. Rood. Vol. xxxii. p. 186, Am. Journal of Science and Arts.

† Astronomical Photography. By Lewis M. Rutherfurd. Am. Jour. Sci. and Arts, xxxix. 304.

stat, through the ammonio-sulphate cell before they enter the brass tube. When the plate of ground glass is used, it is placed between the mirror and the condenser, the diminution of light being overcome by a bull's-eye, where this may be necessary, as in the use of the higher powers.

In order to enable those present to judge of the perfection of the work, he had the representations of some of the familiar test objects exhibited: first, there were thrown upon the screen, from photo-micrographic slides placed in an oxyhydrogen lantern, seven representations of—

The Navicula Angulatum (Gyrosigma Ang.), the original object being $\frac{1}{110}$ inch long, and marked by 52,000 striæ to the inch.

These were photographed upon the lantern slides, magnified as follows: 12, 118, 370, 1562, 2344, 9525, and 19,050 diameters, which gave a series of pictures upon the screen, the linear diameters of which were forty times the above, or, 480, 4720, 14,800, 62,480, 93,760, 381,000, and 762,000; the latter being, in superficial measurement, 762,000 × 762,000, which equals the enormous size of 580,644 millions of times that of the original.

These were particularly interesting, since they exhibited the varied appearance of the object when under the different powers, passing from what appear to be two sets of oblique parallel lines crossing each other, to hexagonal, and finally, under the last to circular markings;* which, however, on moving some distance from the screen, seemed to again change into hexagons.

The Podura Plumbea scale was the next object. The insect from which this test object is obtained is from the $\frac{1}{10}$ to the $\frac{1}{20}$ of an inch in length, and the scale represented in these photographs is the $\frac{1}{300}$ of an inch long, each spike upon this being about $\frac{1}{4000}$ of an inch in length.

Three specimens were shown, which were magnified 522, 756, and 2100 diameters, giving on the screen 20,880, 30,240, and 84,000 linear diameters; these gave most satisfactory representations of the spikes, which seemed to be so clear and well defined as to leave but little doubt as to their shape and structure.

The Pleurosigma Formosum, $\frac{1}{60}$ of an inch in length, and having 36,000 striæ to the inch, was × 640 and 2540, or 25,600, and 101,600 diameters upon the screen.

Finally, to conclude the series, the test plate of Nobert—which is regarded as the most accurate means of determining defining power—had been photographed, and the slides were brought for exhi-

* On the Evidence furnished by Photography as to the Nature of the Markings on the Pleurosigma Angulatum. By Prof. O. N. Rood, Am. Journal of Science and Arts, vol. xxxii. p. 335.

bition. This optician has issued these plates with lines gradually increasing in fineness; and his latest works have exceeded any of the former in this respect.* The first test plate had ten bands, which were ruled at the rates of 443—1964 lines to the millimeter. The second plate, prepared in 1849, had twelve bands; the third plate had fifteen bands, the last one of which was ruled at the rate of 2216 lines to the millimeter. The plates of 1852 had twenty bands, the finest being 2664 to the millimeter ; this was described by Mr. Richard Beck, who, with a $\frac{1}{8}$ and No. 3 eye-piece × 1300, found thirty-five lines, each about $\frac{1}{70000}$ of an English inch apart.

Nobert next prepared a thirty-band test plate, the thirtieth band of which had 3544 lines to the millimeter.

This was the plate described by Sullivant and Wormley. (American Journal of Science and Arts, January, 1861.)

The last plates made by Nobert have 19 bands, the 15th corresponding to the lines of the 20th band of the 30-band plate, and the 19th ruled at the rate of 4430 lines to the millimeter. Dr. Woodward gave a somewhat extended description of his investigations in this direction, for an account of which the reader is referred to his paper in the London Microscopical Journal for 1868. At the time he published that article no microscopist had succeeded in seeing the true lines in any of the bands in this plate beyond the 15th. This spring, however, with a Powell & Lealand immersion $\frac{1}{16}$, he had resolved the four higher bands, and now showed photographs of them. These bands presented the following number of lines,—the 16th 48, the 17th 51, the 18th 54, and the 19th 57, each in about $\frac{1}{2000}$ of an inch. Papers announcing this success had been sent to the Monthly Microscopical Journal and to Silliman's Journal.

These objects were then succeeded by the following, all of which were thrown upon the screen by the lantern from photo-micrographs, the figures giving the number of diameters of the image on the screen.

ANIMAL.

Insects.—Human flea, × 640. Head louse, × 640. Crab louse, × 640. Sheep tick, × 400. Larva of Badger's tick, × 1600. Acarus of Bee, × 2240. Demodex folliculorum, × 7200. Sarcoptes Scabiei, × 4320. Acarus of horse (Sarcoptes equi), × 1920. Female of do. × 3760. Trichina Spiralis, × 7320.

Human Anatomy.—Cartilage, × 1480. Cartilage, photographed in red, × 1480. Longitudinal Section of Bone, × 4800. Trans-

* "Geschichte und gegenwärtiger Zustand des Mikroskops," von P. Harting. Deutsche Original-ausgabe, herausgegeben von Dr. F. W. Theile; zweite Auflage, Braunschweig, 1866, Band iii. S. 169.

verse section of Bone, × 4800. Muscular fibre, × 13,480. Muscle, red, × 13,480. Section of skin, × 600. Section from Ovarian Cyst, × 600.

Comparative Anatomy.—Lung of Toad, in red, × 1200. Villi of Intestine (*photographed by Electric light*), × 1720. Blood of Frog, × 14,800. Human Blood, × 14,800.

Hair.—White child, × 8080. Polar Bear, × 8080. Cat, × 8080· Bat, × 8080. Feather of Partridge, × 8080.

Pathological Specimens.—Colon in Dysentery, enlarged solitary Follicles, × 480. Do ruptured Follicles, × 480. Do. ulcerated, showing margin of ulcer, × 480. Another similar slide, × 480. Extensive ulcer, × 480. The approach to edge of ulcer, showing the granulated appearance of the tissue surrounding it, × 4240. Do. with higher powers, showing increase in the number of cells as the ulcer is approached, × 8880. Also the last five photographed in red. Cholesteatoma, × 9600.

VEGETABLE AND MISCELLANEOUS.

Section of Pine wood, × 3000. Broom straw, × 1280. Heliopelta, Leewenhœckii, × 9400. Cosicnodiscus Omphalanthus, × 11,200. Arachnoidiscus Ehrenbergii, × 16,160. Pinnularia Nobilis, × 11,680. Stauroneis, × 10,440. Isthmia nervosa, × 8000. Cymbella, × 14,200. Anchers of Synapta, × 9600.

The exhibition of the very wonderful perfection arrived at by these processes drew forth repeated applause; and many were the expressions of delight and pride that such a leading position had been gained by the untiring energy in scientific research by a fellow-countryman and his co-laborers, of whom he feelingly and generously expressed his sentiments of praise and esteem.

At the conclusion of the lecture, the gentlemen were politely invited to examine the rooms and specimens of the College of Physicians, which were lighted and thrown open to them.

At a subsequent meeting of the Section, held in the hall of the Academy, Dr. Wm. Pepper moved :

" That the cordial thanks of the Biological and Microscopical Department of the Academy of Natural Sciences be returned to Dr. J. J. Woodward for his beautiful and valuable demonstration of the process and results of photo-micrography, given at the Hall of the College of Physicians on the 31st ult.

" That the Department testifies with pleasure to the great and important advance which has been effected in this interesting branch of microscopical science by the skillful labors of Dr. Woodward and his able assistants."

This was unanimously passed, as was also a vote of thanks by the same body to the College of Physicians for the use of their hall.

PATHOLOGY OF THE TEETH.*

BY RUDOLF HOHL, M.D.,

LECTURER ON DENTAL PATHOLOGY AND THERAPEUTICS AT THE UNIVERSITY OF HALLE, GERMANY.

Translated by Adolf Petermann, D.D.S., Frankfurt a. M., Germany.

Read before the Odontographic Society of Pennsylvania.

In my clinic on diseases of the mouth, I lately had occasion to observe a very interesting case. H. Thiele, seven years of age, suffering from hydrocephalus congenitus, was brought to me, because he very often suffered from toothache. It was necessary to feed him, and even then he was only able to take fluid and quite delicate nourishment. The saliva, which was secreted in considerable quantity, was continually running over the wounded chin, irritated by the weak acid. The teeth were all of a grayish-yellow color, and smaller than milk teeth usually are, owing to a dissolution of the lime-salts, which was caused by the uninterrupted influence of the acid saliva. The enamel was almost missing—only on the neck of the teeth we still find a semicircular piece. The discoloration was more striking on the dentine than on the enamel. External symptoms of caries I was not able to find; neither those blackish flat spots, nor cavities. The peculiar yellowish-white fur on the neck of the teeth, which consists for the greater part of threads and cells of the leptothrix buccalis, and which is found in almost every mouth, was totally missed in this case. I extracted the boy's two temporary lower molars, which were painful to the touch.

The microscopical examination, which was immediately arranged, had the following results: In sawing and grinding the teeth, I found the consistence not inconsiderably diminished. Under an increase of 95 diam., the unequal division of the cementum over the surface of the roots first appeared remarkable; then in layers the stripes of the ground substance of the dentine; further, the extraordinary large mass of the interglobular spaces, and at last the numerous Haversian canals in the cementum and dentine.

The unequal division of the cementum was to such a degree, that in some places we found thick, nearly globular layers, while in others the cementum was very thin and sometimes was totally missing, and then the uncovered dentine must have touched the periosteum. In some places of the roots I observed lacunar deepenings—evidences of the commencement of absorption.

In the dentine, the arrangement of the layers of the ground substance especially appeared on the crowns; the stripes were for the most part parallel with the enamel. With few exceptions, I observed on the top of the stripes numerous interglobular spaces in parallel lines with them.

* Deutsche Vierteljahrsschrift für Zahnheilkunde, II. Heft, IX. Jahrg.

On the stripes, the dentinal canals regularly bend aside from their original direction, and thereby form larger waves. Haversian canals, which, under normal conditions, only occur in very small numbers in the cementum at the point of the root, were found in multitudes in the cementum, as well as in the dentine, and formed a rich, ramified canal-system, which produced a direct connection between the vessels of the periosteum and the pulp. Under an increase of 300 diam., I saw that the fibres of the enamel in some places did not lie close together; the canals of the dentine had for the greater part a wide and manifold expansion and enlargement; the bone cavities of the cementum had a very irregular shape—they were different in size, and had a few short sprigs.

By the microscopical examination we found: in the first place, that the teeth had participated in the general disturbance during the development of the organs; secondly, that in spite of the acid saliva, no caries occurred; and thirdly, that a remarkable dissolution of the lime-salts by the acid saliva was likewise extended over all the teeth of the mouth.

In relation to the first point—the participation in the disturbance of the development—we know that during certain diseases the formation of the teeth suffers from irregularities. The affections which produce irregularities in the development, are scrofulosis, rachitis, and hereditary syphilis; diseases in which, especially, disturbance of nourishment plays a part; a disturbance, the continuation of which is not confined to certain places, but which involves the whole organism. It therefore is not astonishing that, in such a disturbance of the development of the body and all the mental functions, as hydrocephalus is attended with, a defective formation of the teeth takes place. The results of such irregularities, produced by the diseases named in the development of the teeth, are found partly on the contour and partly in the tissues. The first consist either in deviation of the form—the incisors, for instance, take, instead of a chisel-like, a conical form—or in more or less deep furrows, which run in parallel lines, perpendicular to the long axis. These last ones record themselves in a defective development of the laminæ and canaliculi in the cementum; in the cultivation of layers in the ground-substance of the dentine; also in the formation of numerous Haversian canals. The symptoms of an interrupted development cannot well be pointed out by the contour of the teeth in a questionable case, because their original form has in a very high degree been altered by the acids. But they are found in a remarkable degree in the tissues, as results from the preceding description. As far as I know, there does not exist any observation about the occurrence of such anomalies in the development, caused by hydrocephalus.

That, in spite of the acid saliva and its influence in this case, no caries

has occurred in the course of several years, is, in my opinion, to be imputed to the missing of cells of the leptothrix buccalis. We positively know that the first agents which introduce the destruction by caries are acids, which partly originate in the mouth itself, and partly are introduced by food. But we know, with the same certitude—in spite of Magitot's contrary assertion—that acids acting by themselves are never able to produce caries, but that there is another agent wanted, which finally produces destruction of the dentine. It is most likely that the cells of the last-named fungus produce this last effect, by penetrating into the canals of the dentine (after destruction of the tooth-fibres by acids), and destroying the ground-substance. These cells did not exist in this case, because the saliva, which is continually secreted, throws out the cells, which perhaps reach the mouth. In the described specimens we find emollition and discoloration of the dentine; to the completion of the occurrence of caries, we miss but the destroying power, which those cells most likely possess. (I call attention to the observation of Wedl and Heider, that dentine and bones, which are placed in common water, will be perforated by fungus in the course of four or five weeks.)

The discoloration of the lime-salts, which has spread out in the same form over all the teeth, and which I never had occasion to observe, seems to be very peculiar. I have already mentioned that the enamel is dissolved for the greater part, and on the dentine those elevations upon the masticating surface, which correspond with the first point of the ossification, are totally missing. The organic substance has certainly been ruined in course of time by the process of mastication. This observation is certainly worth mentioning, and justifies this communication the more, as contributions to the pathology of the teeth are so rare.

FRACTURE OF THE INFERIOR MAXILLA SUCCESSFULLY TREATED.

BY C. STODDARD SMITH, D.D.S., SPRINGFIELD, ILL.

The following case is presented not so much with the hope of advancing any new principles in the treatment of this class of fractures (though it is believed that the appliance used was different in some respects from any heretofore constructed), as further to illustrate the facility with which these hitherto somewhat unmanageable fractures may be adjusted and kept in place by the use of vulcanized rubber splints.

R. M., aged say 40 years, presented himself in my office, Oct. 28, 1868, for the purpose, as he expressed it, of "having some teeth straightened," which he said had been knocked loose by a blow. A very casual examination developed the fact that a fracture of the inferior maxilla existed, between the left central and lateral incisors, extending downward

through the body of the bone, and tending somewhat obliquely toward the symphysis. On being questioned, the patient stated that he had received a blow on the left side of the lower jaw, midway between the angle and the symphysis, from the fist of a person with whom he had had an altercation. The left fragment was depressed about one-fourth of an inch below the right, but the movements of the jaw were unimpaired; and, so far as could be ascertained, the fracture named was the only serious injury, being unaccompanied by comminution, or any external laceration or evidences of the blow, further than soreness at the spot where it was received, and considerable swelling under the chin in front. There was also considerable submucous effusion of blood under the tongue, and the gums at the point of the fracture were lacerated and bleeding.

The first step in the treatment was the removal of the patient's beard and moustache; and by the time this was accomplished the following plan of operations had been decided upon: A piece of shingle was first cut into the shape of a paddle, and upon this, as an impression cup, was introduced a roll of softened gutta-percha as large as a man's thumb, and pressed against the *upper* teeth, extending back to the molars on each side. An impression being thus obtained, of the ends only of the upper teeth, the roll was removed and hardened in cold water. It was now returned to the mouth, and its lower surface trimmed with a heated knife, as we trim an articulating wax, until the points of all the lower (front) teeth, when the depressed fragment was pushed up into position, just touched the gutta-percha. A roll of wax, made quite soft, was now placed on the lower surface of the gutta-percha, the whole introduced into its place in the mouth, and the broken jaw pushed up from below until the teeth went through the wax and rested against the gutta-percha. On removing and separating the wax and gutta-percha—the former being held up to the light—the uniformity of the teeth was clearly shown, when the correct position was attained. Several attempts were necessary before this was accomplished, which were of course accompanied with some pain to the patient. An attempt was made to adjust a temporary splint, which was abandoned, and the patient dismissed, the jaw being simply supported by a sling.

From the impression thus secured a cast was made, and placed in an articulator—the prints of the upper teeth in the gutta-percha being carefully preserved. On this model a wax splint was now constructed, covering the lower front teeth and gums as far back as a space which existed on either side by the previous extraction of the first molars. It also extended upward to the upper bicuspids on each side, and received the prints of these on its upper surface, the portion in front being cut away in a semicircular form, to afford sufficient room to take nourishment. At a point opposite the canines a wing was made on either side,

attached to the upper and labial portion of the splint, and extending outward and backward, intended to clear the corners of the mouth, and serve as an attachment to lacings under the chin. These wings were two and a half inches in length, and were made very thick and heavy, to allow of dressing down after being vulcanized, as the case might require. The wax splint being completed, it was flasked in the ordinary manner (the ends of the wings, however, requiring to be bent inward to get it into the flask), packed and vulcanized as usual, but at a low heat. After removal from the vulcanizer, the splint was dressed up, and the superfluous rubber cut away as much as was consistent with the requisite strength. The prints of the upper bicuspids on each side were left in the rubber, but the front of the splint was cut away until the ends of the two teeth between which was the fracture could be seen when the splint was in position, thus affording a certain means of knowing whether the fragments were in apposition or not. The part of the rubber fitting over the teeth was trimmed out until the splint would slip easily into its place, and the whole smoothed sufficiently to avoid chafing, the ends of the wings being rounded, and bent outward by heating, to avoid undue pressure upon the cheek. An impression in plaster was now taken of the chin, and upon a plaster cast made from it was moulded a cup of gutta-percha, extending upward toward the lip, and well back under the chin. The outer surfaces of the wings being filed flat, there was attached to each, by small wood-screws, a german-silver plate two and a half inches long and three-fourths of an inch wide, in each of which three slots were made, about one-eighth of an inch from the lower border.

All being now ready, the splint was adjusted upon the teeth, the wings projecting out at each corner of the mouth, and extending backward upon each cheek. A compress was placed under the depressed fragment, the gutta-percha cup placed over it, the jaw pushed into its proper position, and retained there by means of tapes passed through the slots in the metal plates, attached to each wing, and carried back and forth under the chin, these being drawn tight, until, by looking at the front teeth through the hole cut in the splint, it could be seen that the fragments were in perfect apposition. The tapes being secured, it was deemed best to hold the whole in position by a Fox's bandage—a cap for the head, and straps and buckles for the chin—which was drawn up so as to hold the rubber splint firmly against the upper teeth. This effectually supported and guarded against any movement of the parts, and at the same time sufficient room was afforded, by means of the hole in front, to enable the patient to take liquid nourishment. The apparatus was not finally adjusted till the third day after the fracture, but was worn without discomfort for three weeks without removal, constant observation of the teeth showing that the parts remained absolutely immovable. The bandage was taken off occasionally, and the patient could receive pieces

of soft bread and potato. At the end of three weeks the skin under the gutta-percha cup ulcerated, and it became necessary to remove and cleanse it; the splint remaining in position, and the mouth being kept tightly closed during the manipulation. The parts were dressed with simple cerate, with a little carbolic acid; and this was repeated every day or two for another week, when the splint was cautiously removed, and union found to have taken place, the teeth being in perfect apposition. It was deemed best, however, to readjust the splint for a few days longer, when it was removed entirely. Some uneasiness was felt on the removal of the splint, on account of the fact that the back teeth antagonized first, leaving a space of nearly one-quarter of an inch between the front teeth. It was feared that some injury of the joint had taken place, but further consideration led us to believe that the malarticulation was due to the contraction of the internal and external lateral ligaments, and the interarticular cartilages, from disuse, and the position in which the jaw was held by the splint, thus drawing the condyle up into the glenoid cavity, and if so, that this would correct itself on the removal of the apparatus. Our opinion proved correct, and the front teeth articulated in three or four weeks. It now appeared that by the use of the Fox's bandage the lower jaw had been drawn back so that the lower teeth struck behind the upper ones—a result which was not looked for in a patient of that age; but it was believed that this, too, would speedily correct itself, which it has since done, and the case may now (Jan. 20th) be regarded as in a normal condition.

The advantage of this peculiar form of splint consists in the lateral wings, which secured the fragments in position without regard to bandaging or strapping the lower jaw, thus admitting of a much earlier and fuller motion of the jaw than when the teeth are required to be kept together, and the patient consequently is enabled to take nourishment with much greater ease. The lacings under the chin, and attached to the wings, held the fractured ends of the bone in absolute and immovable contact.

COMPENSATION.

BY J. S. LATIMER, D.D.S., NEW YORK.

In closing my remarks descriptive of filling a compound cavity in a superior molar, I said (p. 355): "All that now remains is to rinse off the polishing powder and exhibit the result of our labor to the patient, who, if he appreciates it as people generally do, will be willing to pay a remunerative price for our earnest efforts to do right."

Having some years ago advanced in the Dental Cosmos the opinion that all labor of hand and brain is, and should be, like all commodities, subject to the law of supply and demand in the matter of price, I need

not go over that part of my subject again, but will confine myself to the methods of estimating the rates of charge for each particular case.

Probably a majority of dentists, in deciding upon the amount of a professional fee, take into consideration the time and material consumed, the demands upon their time by other parties, the ability of the patient to pay; and, from all these, they make a hasty *guess*, which is often unsatisfactory to one or the other of the parties concerned. We have all felt the need of some more definite rule by which we might be entitled to a certain compensation for our time.

For the past few months, instead of charging for the operation performed, I have charged for the fragments of my life devoted to my patient. Several of our best operators are now practicing on this plan, and it was at the instance of one of these that I adopted it. The following are some of its advantages: certainty on the part of patient and dentist that the charge is correct; the patient has a definite starting-point from which to estimate the probable expense of the desired operations; it settles the matter of guarantees; the dentist gets paid for thousands of minutes which would otherwise be consumed by the patient in "making up his mind" to submit to an operation; examinations and advice cease to be gratuities, and hence will be more thoroughly done; it is almost a panacea for sensitive dentine, and is excellent for the timid and talkative; children cease to be unprofitable patients; and finally, the incitement to hasty operations being removed, the patient is likelier to get what he pays for. If a man wants a house constructed, he can have it done by contract—if he desires it *well* built, he has it done "by day's work."

With reference to the arrangement of the details there is a little difference, some charging an average price per hour, which shall be sufficient to cover the cost of gold employed in filling all sorts of cavities; while others charge a less proportionate price for time and a higher one for the introduction of gold, to cover the cost of material. Of the two, the latter is more exactly just, it seems to me.

My engagement card, on one side, reads as follows: "Engagement for the sitting beginning at ——, and ending at ——.

"Terms per hour, $3, except for extracting teeth or inserting gold, for which $7 per hour will be charged. For unkept engagements $1 per hour will *invariably* be charged, unless 36 hours' notice be given.

"Except by express stipulation, payment is due for each sitting at its close."

Many prefer to charge full price for lost time; but, after trying it, I have modified the plan, as stated in my card. Few people understand the value of time, and I know of nothing more likely to give them a suitable appreciation of it than the method I here recommend.

At first, however, we meet with an embarrassment. A sitting is finished, and the patient inquires the amount of his indebtedness, to answer which requires an arithmetical calculation.

To overcome this difficulty, and for other obvious reasons, I devised a table, on a properly-ruled piece of card-board, with a heading something as follows:

Date.	Name.	Began to operate.	Ceased to operate.	Began to pack gold.	Ceased to pack gold.	Began to lose time.	Ceased to lose time.	Net time lost.	Hours at $3.	Hours at $7.	$

On this is jotted at the moment the data for the charge. When the side of the card has been filled, a half sheet of commercial note, properly ruled, is pasted or gummed at its edge, and attached to the card just below the line, leaving the heading exposed, to answer for this and many future additions, while free access to the old memoranda is allowed.

On the opposite side of the card is pasted a table, showing at a glance the price, from one minute up to ten, and thence for every additional five minutes up to sixty.

When a bill is to be made out, the sum of the hours at $3 and the same at $7, with their extensions, complete the bill.

Here is no complication—nothing on which to hang an objection, as is too often the case by the other method. Of course, any one desiring to try this plan, will be obliged to experiment for a few days, to determine the amount per hour calculated to bring the prices desired.

IMPROPER EXTRACTION OF TEETH.

BY THOMAS H. BURRAS, NEW YORK CITY.

It is now some forty years, and I remember as of yesterday my first and successful effort at the extraction of a tooth. This operation was then, and is at the present time, not unfrequently attempted by persons who have no pretensions whatever to any anatomical knowledge, and in many instances is practiced by the commonest mechanics.

The proper extraction of a tooth requires for its safe performance much care and firmness, a correct acquaintance with the anatomy of the parts concerned in the operation, and a nice adjustment of instruments suitable to every particular case.

Almost every day we hear of the loss of portions of the *jaw-bone*, the improper extraction of sound teeth, in mistake for the imperfect ones, and other barbarities, for which the barber, village blacksmith, or some other ignoramus, has to atone.

At present, by the use of nitrous oxide, some madly play with their kinsman's undecayed bones, rattle them out like dice upon a table, and appear to practice this profession merely for the amount of money that can be made by it. Such men, with no higher or nobler motive than mere gain, are totally unfit to be intrusted with the teeth of human beings. They would be more interested in promoting caries than in

preserving the teeth, for more money could be made in that way than any other, by first improperly extracting the teeth and then supplying artificial substitutes.

The general health and the preservation of the teeth should be regarded as the greatest blessing, and special honor and reverence should be paid those who are able to preserve them.

In consultation with his patients the dentist should feel that to his care is committed a sacred trust, and that the responsibility rests upon him of arresting disease and keeping the teeth in perfect health.

Shall he neglect that which he has undertaken to perform? Shall the desire of personal ease prevent him from undergoing the necessary labor to qualify himself to assume this responsibility?

The life of the true dentist should be one of constant application and study, as the improvements in our art—the almost daily advance in dental science—are now so rapid that when the dentist ceases to be a student he must fall behind, and is not capable of the full professional justice which his patrons have a right to demand. No matter what condition or deformity he is called upon to treat, if he cannot give it the best and most proper treatment known at the time he has failed in his duty. There is no excuse which can justify him in being ignorant of any new application or improved mode of treatment after it has been made public through the medium of our many dental publications. I do not mean that all the *vaunted novelties* and *clap-traps* of the day are improvements, or that the pretended originators of so-called improvements have a right to any recognition until they are proved, by active minds and thinking men, to be facts.

PROCEEDINGS OF DENTAL SOCIETIES.

CONNECTICUT VALLEY DENTAL ASSOCIATION.

The semi-annual meeting of the Connecticut Valley Dental Association was held at Greenfield, Mass., June 10th and 11th.

The President, Dr. Jas. McManus, of Hartford, in the chair.

The first subject for discussion, viz., "The best Treatment of the First, in order to secure a perfect Second Dentition," was opened by Prof. L. D. Shepard, of Boston.

He could report a very pleasant experience with little patients, and had been quite as successful with them as with those more advanced. He felt the importance of instructing mothers with regard to the care of the deciduous teeth, from the time of their eruption till they are replaced by the permanent set. Care and gentleness of manner are demanded if one would gain the confidence of a child; the mind should be diverted and stimulated by pleasant conversation. When the child

is impressed with the importance of saving these teeth, it will bear the necessary operation, if carefully performed, with great fortitude. If the pulp was exposed, he would devitalize without disturbing the roots. He had used gold, tin foil, Hill's stopping, etc., but preferred amalgam to either, as proving the best in a majority of cases. Although this preparation is not as universally approved as gold, in his experience it had given excellent satisfaction.

Dr. E. G. Leach, of Boston, used amalgam almost exclusively in crown cavities. He favored the extraction of deciduous teeth when a source of much annoyance.

Dr. Riggs, of Hartford, approved of retaining deciduous teeth their full time unless badly diseased. In preparing cavities he does not excavate deeply; prefers leaving a layer of decomposed bone as a non-conductor, but is careful to have the walls of the cavity thoroughly excavated, and fills with amalgam; has never noticed injurious results from this preparation; does not like oxychloride of lime or Hill's stopping, as they wear away too quickly.

Professor Hitchcock, of Boston, differed from Dr. Riggs. He would not leave decomposed bone in a cavity, unless it were a very slight portion to prevent exposure of the pulp; would then treat with creasote or carbolic acid; advised retaining the deciduous teeth unless they caused great disturbance.

Dr. Riggs would be understood to favor the greatest care in removing all decomposed dentine, if practicable. When the approximal surfaces are decayed, he would separate freely with the file.

Professor Hitchcock objected to leaving carious dentine in the cavity, because it has the power to extend itself, being saturated with a decomposing acid; but, if necessary to leave any, would treat with creasote, carbolic acid, or, what he prefers, oxychloride of zinc. He questioned the necessity of retaining the deciduous teeth in order to maintain the expansion of the jaw; he considered that the capsules of permanent teeth occupy all the space they can obtain, and may be sufficient, in proof of which he cited the case of a child who had no deciduous teeth, but whose permanent teeth came in regular order; would retain the deciduous teeth unless very troublesome. Mistakes often occur in extracting a lower deciduous canine tooth to make room for a lateral; he would extract the first deciduous molar, if necessary; he often has cut off the canine with a file to allow the upper teeth to pass over.

Dr. Riggs thought that caries would not extend if the walls of the cavity were thoroughly prepared and perfectly filled; fermentation would thus be prevented.

Professor Hitchcock agreed with Dr. Riggs that caries may be arrested, if only a very small portion of the carious bone is left near the nerve. In some cases caries is arrested by nature; the bone beneath

the caries becomes more dense and the dental tubuli obliterated; heat, air, and moisture are necessary to fermentation.

Dr. Leach, remarking upon the effect of creasote upon the teeth, said it would prevent fermentation; he thought that caries would be arrested if a cavity were sealed up, and no more foreign matter or moisture were allowed to come in contact with it than was present when sealed.

Dr. Jones, of Northampton, when treating deciduous teeth which require devitalization of the pulp, would not fill the roots, but simply the crown cavity. He then drills a small hole into the pulp cavity at the margin of the gum. This allows gases to escape, and prevents the formation of abscesses. The same treatment upon teeth where abscesses have already formed, will give great relief, and, as it is painless, may be readily performed.

The subject of bleaching teeth was opened by Dr. Searle, of Springfield, who related a case where a perfectly sound tooth became discolored without any apparent cause that he could satisfactorily determine. He asked for the experience of those present in the successful treatment of such, or similar cases.

Dr. Porter, of Chicopee, had been successful in treating discolored teeth with Labarraque's solution. Dr. Leach had tried oxychloride of zinc with good results. After having removed as much of the discolored dentine as was allowable, he lined the walls of the cavity with this preparation.

Prof. Shepard urged caution in the relation of so-called successes, as they often tend to mislead those who are not familiar with that style of operating.

Professor Hitchcock then read a very able and interesting paper on "Salivary Calculus." He considered, in detail, its varied phases, and its effect on tooth substance, the alveoli, and the gum tissues; also, the mode of treatment in removing and in restoring the gums to a state of health.

Dr. Riggs followed, stating that for twenty-five years past he had treated this condition of disease in the alveolar processes and gums with marked success, and referred to the clinic held by him at Northampton, two years ago, when he operated on the teeth and gums of Dr. Goodrich.

The case presented at the time an almost hopeless appearance, and to-day we have the patient with us, and the case is a radical cure. He referred to several other cases ocurring since then, where success had attended his operations.

With instruments of the right shape and temper, and the operation performed in the manner which he had already described at several of our meetings, and demonstrated at the "clinic" referred to, one could be sure of effecting perfect cures in a majority of cases.

Dr. Leach detailed his mode of operating, and exhibited some delicate and perfectly-shaped instruments for removing any accumulations on the roots of teeth.

Dr. Riggs advised a thorough operation at the first sitting, and that each tooth, portion, or whole jaw operated on, be finished at that time.

Dr. Leach preferred several sittings, at an interval of a week, or ten days. He considers that, in this way, he makes the operation less severe for his patient, and that he can better determine what is needed.

Dr. Riggs stated that, in his opinion, the course pursued by Dr. Leach made the operation a very much more painful one for the patient, as, after a portion of the "tartar" has been removed, there was an effort on the part of nature to set up a healthy action, and, as a consequence, the parts would be much more sensitive to an operation. While they are in the diseased state, they are not as acutely sensitive, and therefore the patient can bear more. He instanced an amputation. No surgeon would be justified in making an incision, and then waiting for a few days before completing the operation. The treatment of the gums is a surgical operation, and should be performed as such.

Prof. Hitchcock exhibited specimens under the microscope.

SECOND DAY.—*Friday*, 10 A.M.

Remarks on mechanical dentistry being in order, Dr. Beals, of Greenfield, gave his experience with the "Folsom Ridge." When properly applied, he considered it as great an improvement over the common air-chamber as that was over the old style of plate; has had the best success with it, and can honestly recommend it; has used it in all cases, even when putting but a single tooth on a plate.

Dr. Jones, of Northampton, considered the "Folsom Ridge" an improvement, particularly when applied to lower sets of teeth; has had no unpleasant results from the ridge irritating.

The discussion was continued by Drs. Riggs, Post, Searle, Rowland, and Davenport, and the different classes of work considered in detail, making it a very interesting subject to the members.

The subject of six-year old molars was taken up.

Prof. Shepard advocated their extraction in a crowded state of the jaw. They should be taken out at the time the second molars are erupting.

Dr. Riggs would not extract six-year molars for the sake of getting them out of the mouth, but to secure a perfect dentition and a healthy state of the mouth; would not sacrifice them if there was room without crowding the jaw. If that were the case, and the teeth were imperfect, he would remove these in preference to the bicuspids. A crowded state of the jaw is a source of many of the diseases of the teeth.

Success depends upon operating at the right time. He illustrated

his remarks by models showing the difference in result from extraction at wrong and at right times.

Dr. Goodrich offered the following resolution, which was adopted:

Whereas, The credit for originality in surgery is always conceded to the one who first publicly announces a new operation, appliance, or method of treatment,

Resolved, That in the judgment of the Connecticut Valley Dental Association, the credit of originating and first publicly describing a new treatment for the cure of inflammation of the gums and absorption of the alveolar processes, or the so-called "scurvy of the gums," thereby saving and restoring to comparative firmness the loosened teeth, is due to Dr. J. M. Riggs, of Hartford, Conn., he having detailed his method of operating to this Society years ago, and illustrated it at the request of the Society, by a clinic upon Dr. E. M. Goodrich, of Westfield, Mass., at our meeting at Northampton, in June, 1867. He also operated in Boston in August, 1866, with acknowledged success, upon Dr. D. K. Hitchcock.

Resolved, That this resolution be forwarded to the journals for publication.

The afternoon session was taken up by a familiar talk upon miscellaneous subjects.

Adjourned to meet at Springfield, Mass., Oct. 21 and 22, 1869.

W. H. Jones, *Secretary*.

MICHIGAN CENTRAL DENTAL ASSOCIATION.

An adjourned meeting of the Michigan Central Dental Association was held in Jackson, Michigan, June 23d, 1869.

There were present the following:

Officers.—Drs. C. E. Bartlette, President, Battle Creek; C. H. Eggleston, Vice-President, Marshall; Wm. J. Miller, Secretary, Marshall; Geo. P. Holmes, Treasurer, Battle Creek.

Members.—Drs. F. S. Graves, Geo. H. Mosher, D. W. Smith, J. Robinson, Jackson.

Members Elected.—Drs. B. Banister, Kalamazoo; J. A. Watling, Ypsilanti; W. H. Jackson, C. B. Porter, Ann Arbor; J. L. Lanterman, Lansing; Geo. Willis, Grass Lake; M. H. Knapp, Adrian; M. S. Phillips, W. C. Gardner, Charlotte; C. B. Ellsworth, Schoolcraft; C. H. Rose, W. H. Dorrand, C. S. Case, Jackson.

An essay was read by Dr. Geo. H. Mosher. Subject, "Treatment of Diseased Gums."

Dr. Geo. P. Holmes read an essay on "Affections of the Teeth without Caries." After its reading the subject was generally discussed.

Dr. Robinson said he had used common wood-ashes on sensitive teeth, where they had become sensitive from irritation by clasps of partial plates. Also, had used the crystals of nitrate of silver with much sucess on sensitive dentine.

The question, "How to treat Disease of the Periosteum," was generally discussed.

Dr. Holmes had used counter-irritation, and given internally mercurius vivus.

Dr. Watling had used for counter-irritation tinct. cantharides and aconite.

The "Treatment of Alveolar Abscess" was next discussed.

Dr. Watling used the knife, and preferred it to any other remedy. Where it was a front tooth, he passed the knife through the gum and alveolus to the root of the tooth, cutting the sac or ulceration entirely away; and had never had any difficulty whatever in destroying the abscess.

Dr. Robinson read an essay on "The Best Method of obtaining a Good Reputation as a Dentist," claiming that in dentistry, as in every profession, the first requisite toward establishing reputation or character is true manhood and adaptation—being suited to your calling. The next requisite is humility. I do not mean that we should distrust ourselves and our abilities, and be doubting and timid in our professions, but have humility enough to learn of the weakest person who has any information on any subject we desire to know, and at least be humble enough to be always trying to keep up with every new improvement of the age. The next requisite is courage—not boldness, or impudence, that sometimes passes for courage, but that which will enable us to be patient under discouragements; to give our best efforts to those who employ us; to be clean and neat; to make over a set of teeth that is not fit to be worn; to take out a poor filling and replace it with a better,—in fact, to be true to ourselves, and not dishonor our profession through ignorance or carelessness, or vain pretentions of doing what we do not thoroughly understand. Lastly, we must have singleness of purpose,—if we have but one talent, let us concentrate that upon our profession,—we must do that to establish a good reputation in any department. Very few persons have arrived at any degree of excellence without a steady and steadfast purpose in a single direction. We must also *love* our profession;—we all follow whatever we really love. We cannot extricate ourselves from our loves. We are absolutely forced to think and talk of what we really love. Then let us love our chosen work; and, without assumption or affectation; but in humility and with courage, and singleness of purpose, strive to form character and reputation as dentists.

On motion, the Chair appointed a committee (consisting of Drs. J. A. Robinson, C. B. Porter, and J. Lanterman) to select subjects and writers for the next meeting.

The Committee appointed the following persons, with their subjects:

"Treatment of Diseased Gums and Offensive Breath."—Drs. G. H. Mosher and D. C. Hauxhurst.

"Causes of Failures in Filling Teeth."—Drs. B. Banister and W. H. Jackson.

"How to Correct Irregularities of the Teeth."—Drs. J. A. Watling and M. H. Knapp.

"Defects in the Manufacture of Artificial Teeth."—Drs. C. E. Bartlette and J. A. Robinson.

On motion, the meeting adjourned to meet at Kalamazoo, Michigan, on the third Tuesday in January, 1870.

WM. J. MILLER, *Secretary.*

NORTHERN IOWA DENTAL ASSOCIATION.

THE Northern Iowa Dental Association held its annual meeting at Dubuque, June 8th.

Dr. P. C. Branch, of Vinton, President.

Several new names were presented for membership, and duly elected.

There were a goodly number of the profession present from different parts of the State, and an increased interest was generally manifested.

The following officers were elected for the ensuing year:

President—Dr. E. L. Clarke, of Dubuque; Vice-President—Dr. J. Nicholson, of Tama City; Corresponding Secretary—Dr. A. B. Mason, of Waterloo; Recording Secretary—Dr. J. T. Abbott, of Manchester; Treasurer—Dr. C. Poor, of Dubuque.

Dr. E. L. Clarke, on taking the chair, made appropriate remarks, reviewing the progress of the profession, closing with a favorable augury for the future. Dr. Clarke is probably one of the oldest practitioners in the State, and is well prepared to make the comparison of what dentistry was when commenced with what it is at the present time.

Dr. Branch, being located toward the centre of the State, did not see matters in quite so favorable a light as did Dr. Clarke. He complained of traveling quacks, who push their unprofessional itinerancy with a zeal that, were it directed in the proper channel, would tell largely upon the upbuilding of the profession.

The members generally spoke on the subject, and several laughable facts were related.

Dr. E. L. Clarke had been appointed to read an essay on "Alveolar Abscess;" he had nothing written, but at some length gave his views upon the cause and treatment of the disease. Many questions were asked by the members, and answered by the doctor. A general discussion followed.

The following resolution, presented by Dr. A. B. Mason, was adopted:

Resolved, That a committee of three be appointed to act with a like

committee, which we hereby ask the "Iowa State Dental Association" to appoint, to take such action as shall secure the passage by our State Legislature of an act for the regulation of the practice of dentistry.

Drs. A. B. Mason, C. Poor, and C. A. Clarke were appointed said committee, with power to fill vacancies.

The importance of some regulating law was strongly urged by all present.

Dr. A. B. Mason read an essay on "Filling Pulp Cavities." A general discussion followed. Some diversity of opinion existed in regard to the time of filling pulp cavities after the pulp had been destroyed either by arsenious acid or other application. Some advocated immediate filling as soon as the pulp could be removed; while others invariably treated the cavity with carbolic acid, alcohol, or creasote (as the case might demand), for from three days to ten, or until the slightly scarlet-tinged appearance had disappeared.

The subject of "Dentistry as compared with other Professions pecuniarily" was taken up, and a general discussion followed.

Several members thought they had not met with that success that they might reasonably expect, or which would have followed the same efforts in other professions or departments. The cause of this they attributed to the practice of itinerating practitioners, who bring discredit upon the profession.

Dr. J. T. Abbott, of Manchester, read an essay upon the "Pathology of Dental Decay," for which he received a vote of thanks.

The following committees were appointed by the President:

Executive Committee.—Drs. A. B. Mason, Will P. Dickinson, and A. V. Eaton.

Committee on Membership.—Drs. J. T. Abbott, P. C. Branch, and C. A. Clarke.

Committee on Dental Ethics.—Drs. H. G. Knapp, M. D. Goble, and F. C. French.

Dr. C. A. Clarke was appointed delegate to the American Dental Association at Saratoga.

The President invited the Association to meet at his residence on the evening of the second day of the session,—a bountiful supper having been provided, to which the members did ample justice.

The next annual meeting of this Association will be held at Waterloo, in June, 1870.

J. T. Abbott, *Recording Secretary.*

SUSQUEHANNA DENTAL ASSOCIATION.

This Association held its annual meeting at Jersey Shore, Pa., on May 12th, 1869, the President, Dr. C. S. Beck, in the chair. The following were elected officers for the ensuing year:

President.—C. S. Beck, M.D.

Vice-President.—John D. Wingate, D.D.S.

Recording and Corresponding Secretary.—J. M. Barrett, D.D.S.

Treasurer.—H. Gerhart, D.D.S.

Librarian.—Dr. R. E. Burlan.

Executive Committee.—Drs. Martin, Gerhart, and Wingate.

Drs. D. Dieffenbacher and Grant L. Keyser, of Jersey Shore, were elected members of the Association.

Dr. J. C. Snyder, of Jersey Shore, and Dr. W. H. Messimer, of Williamsport, were proposed for membership.

An essay on "Extracting Teeth" was read by Dr. J. D. Wingate.

An essay on "Finishing a Filling" was presented by Dr. C. S. Beck, giving his method in detail, especially as to finishing and polishing.

Dr. Messimer spoke of "Rose Pearl Base." He is using it in his practice, and thinks it valuable for full dentures. Partial sets do not do so well, especially if made thin.

Delegates to the State Dental Society.—Drs. J. L. Fordham, J. L. Andrews, C. W. Renn, D. Dieffenbacher, H. H. Martin, and J. M. Barrett.

H. Gerhart, D.D.S., was appointed to deliver the public address before the Association at its next session; H. H. Martin, D. Dieffenbacher, and J. M. Barrett, essayists for the same occasion.

The subject chosen for debate at the next meeting is, "Dental Associations."

The Association adjourned to meet at Wilkesbarre, Pa., on the 10th day of November next.

This meeting of the Association will be remembered by all as being among the best, if not the very best and most profitable session yet held.

J. M. Barrett, *Secretary.*

BOSTON DENTAL COLLEGE.

There have been forty-eight students in regular attendance during the lecture season. Among the number were six students who have had three years' pupilage with practitioners of dentistry approved by the faculty.

The Board of Trustees voted that the degree of Doctor of Dental Surgery should be conferred on the three years' students, as also upon those who have had eight years' practice; as both our charter and the unanimous vote of the Board of Trustees, establishing the policy of the College, will clearly show. However, owing to an injunction served on the President and Secretary of the College, restraining them from conferring degrees on the three years' students, it was thought best to confer the degree on only two students, who have attended one course of lectures at other colleges. Our charter requires *two full courses* of all students graduating at this College.

At the hearing before Judge Colt, he ruled that the meaning and intent of the charter must be interpreted by the common usages of medical and dental colleges. The injunction was made perpetual against graduating students on two full courses given within one academical year. No one, I think, will object to the high standard which this decision confirms to the College.

The first Commencement exercises of the College were held in Mercantile Hall, June 14, at 10 o'clock A.M. They were witnessed by a large number of ladies and gentlemen, and were interspersed with music by Gilmore's band. They were prefaced with prayer by Rev. William R. Nicholson, D.D. Four members of the graduating class read dissertations, as follows:

Charles M. Murphy, of Dover, N. H.—"Inflammation."

Washington I. Thayer, Chelsea, Mass.—"Anæsthesia."

Horace M. Perkins, Boston.—"Odontalgia."

Albion M. Dudley, Peabody, Mass.—"Digestion."

The dissertations were marked with a high degree of excellence, and reflected credit upon the graduates and the faculty of the College.

By reason of the injunction mentioned above, only two of the class received the degree of Doctor of Dental Surgery, viz., Albion Manley Dudley, of Peabody, Mass., and Earl Glover Barton, of New York City. The degrees were conferred by Prof. I. J. Wetherbee, D.D.S., President of the College.

Professor John A. Follette, M.D., then delivered the valedictory address.

In the evening, by invitation of Prof. L. R. Sheldon, M.D., the students attended a levee at his residence at the South End. Over one hundred guests were present, including many distinguished personages. An interesting address was delivered to the students by the host, after which the company partook of a sumptuous collation.

INDIANA STATE DENTAL ASSOCIATION.

THE eleventh annual session of this Association met in the City of Indianapolis on Tuesday, June 29th, 1869.

The election of officers resulted as follows:

President.—Dr. John F. Johnston, of Indianapolis.

1*st Vice-President.*—Dr. A. M. Moore, of Lafayette.

2*d Vice-President.*—Dr. W. H. Pifer, of Lafayette.

Secretary.—Dr. Seneca B. Brown, of Fort Wayne.

Treasurer.—Dr. C. C. Burgess, of Indianapolis.

Subjects for discussion: "The best Method of Controlling the Oral Secretions in Dental Operations," "The best Protection for Exposed Nerves," "What are the Indications for Extraction of Teeth?" "Dental Therapeutics," "Mechanical Dentistry," "Miscellaneous."

There was a full meeting of the Association, and a very lively interest manifested. The discussions were participated in by most of the members. Many valuable essays and papers were read. One from Dr. W. F. Morrill, of New Albany, on "How to Conduct an Office Practice," received a hearty indorsement, by a vote of thanks from the Society, and a copy was solicited for publication. The teachings of this paper are well calculated to elevate professional bearing. It is understood that it will be published in pamphlet form.

A very able paper on "Microscopy of the Dentinal Tubuli," by S. P. Cutler, M.D., of Holly Springs, Miss., was read, when a motion prevailed that it be published, and the Secretary was directed to communicate to the author a vote of thanks.

After two days of unabated interest, the Association adjourned, to meet in the City of Indianapolis, on the last Tuesday of June, 1870.

JOHN F. JOHNSTON, *President.*

SENECA B. BROWN, *Secretary.*

EDITORIAL.

AMERICAN DENTAL ASSOCIATION.

As this comes from the press the American Dental Association will be in session at Saratoga, and it is sincerely to be hoped that the proceedings will be characterized by a strict recognition of the constitution and objects of the organization. Established as a *representative* body, it *has* and *can* exert a more salutary influence over the profession upon that basis than it could by becoming an exclusive society, composed of men whose attainments, tastes, and inclinations would naturally draw them together, or by degenerating into a mere mass convention, as it gave some evidence of doing at Niagara. Less of parliamentary tactics, and discussion upon points of law, and more attention to scientific and practical subjects, would not only render the meeting pleasant, but profitable. The plain, simple statement of carefully and accurately observed facts, and the quiet, easy presentation of opinions or theories in a suggestive and argumentative manner, will contribute most toward this end.

The practice which has sometimes prevailed, of having the regular order of business suspended, so as to enable one or more members, who have very important matters to offer to the Association, but are unable to wait until the *proper* time arrives to present them, should not be tolerated. Over and again under such circumstances, the time and patience of members have been tried by long-drawn and threadbare descriptions of hackneyed subjects. Such parties should recognize that if they have something to *tell*, they have still more to *learn* from others, and therefore bide their time with due patience. J. H. McQ.

INJUNCTIONS AGAINST DENTAL COLLEGES.

In the July number of the Dental Cosmos intelligence was presented that injunctions had been applied for, and issued by the courts, against the New York College of Dentistry and the Boston Dental College, by which the charter of the first was forfeited, and the latter was restrained from conferring degrees upon students who had merely attended two courses of lectures in one year. All we know of the merits of these two cases is briefly stated in the account referred to. In each of these instances, the charges preferred were made by parties connected with the institutions (the Dean of the Faculty in the first case, and six of the Board of Trustees in the other), persons who had the fullest opportunities of knowing all the workings of the respective schools, and of any violation of law which might occur. An editor, like a judge, has nothing to do with the motives, good or bad, prompting parties to make charges. The question to be decided is, Were the charges well founded? The evidence submitted to the judges, who are to be regarded as impartial administrators of justice, was sufficient to induce them to issue the injunctions; therefore it follows that they were convinced that the charges were substantially proven. The disposition to confer degrees with undue haste was the prominent charge in each instance.

Without going back of the findings of the courts, the decision in these cases justifies the expression of an opinion, long entertained, that the desire for *degrees*, rather than an *education*, on the part of many entering the profession, or already engaged in practice, and the disposition on the part of colleges to favor and encourage such wishes by holding out inducements, that a certain number of years will be regarded as equivalent to one course of lectures; or of going still further, and admitting to an examination without attendance upon lectures at all, tends not only to retard the progress of education in the dental profession, but in addition reacts upon the institutions so far as the mere matter of support is concerned. If such inducements were abandoned by all, and two full courses insisted upon in every instance, as in the case of medical colleges, it would be better for the profession, and for the schools, in point of reputation and material support. That this must be done, sooner or later, is beyond a doubt; but when, remains to be seen. It is to be regretted that the custom which prevails in England does not exist here, by which teachers are relieved of any participation in deciding upon the qualification of their students when coming forward as candidates for a degree. Colleges under such circumstances would become what they should be, educational institutions only. As it is, a diploma is valuable in proportion to the knowledge and attainments of its possessor, and the character of the institution which confers it.

It is a matter of regret that there was the slightest cause to warrant

such proceedings as those referred to. While saying this, we take no pleasure in contemplating the closing of one institution, and neither anticipate nor hope that others will be compelled to do so soon; but believing that there is room and need for educational institutions, feel confident that good will grow out of these decisions, and that the profession generally will be benefited by the experience. It indicates a healthy condition of society when laws can be appealed to and brought promptly to bear in the prevention or correction of any abuse, great or small.

We have said before, and now repeat it, that "it demands no argument to prove that the more institutions of *learning* a country possesses the more extended is the diffusion of knowledge and the more enlightened and useful are its people. That which is true of general education is equally true of professional education."* It is well, however, to remember what CHRIST taught, that "a house divided against itself cannot stand." This holds in all human operations, and in none more than in the conducting of a college. The strict observance of law, the determination on the part of each member of the Faculty to faithfully perform the appointed duty, combined with the disposition to agree to disagree upon controverted points, and to submit to the will of the majority, are elements indispensable to secure the success and perpetuity of such undertakings. J. H. McQ.

DR. THOMAS W. EVANS, who has been spending a couple of months in America, leaves on his return to Paris in the steamer of the third of August.

It was his purpose to remain, in order to be present at the meeting of the American Dental Association at Saratoga; but he was unexpectedly recalled by pressing duties, and forced to abandon this intention. We wish him a safe return to his home. J. H. McQ.

BIBLIOGRAPHICAL.

DISEASES AND SURGERY OF THE MOUTH, JAWS, AND ASSOCIATE PARTS. By JAMES E. GARRETSON, M.D., D.D.S., late Professor of Principles and Practice of Surgery in Philadelphia Dental College.

A TREATISE on the above subject, of about seven hundred pages, is passing rapidly through the press of J. B. Lippincott & Co., and will be ready for delivery in the fall. Having had an opportunity of looking over the first three hundred pages,—which are devoted to the anatomy of the mouth and associated parts, the diseases of the teeth and their remedial treatment, while reserving the privilege of commenting upon its

* Dental Education: an Address by J. H. McQuillen, M.D., read before the Merrimack Valley Dental Association. Dental Cosmos, vol. vii. p. 312. 1865.

contents when the work is issued from the press,—we feel no hesitation in saying that it will become a standard work, meeting the demands of the dentist, surgeon, and physician more completely than any work which has been published heretofore in this department of practice. It will be most profusely illustrated by well-executed wood-cuts. J. H. McQ.

OBITUARY.

BENJAMIN C. LEFLER, D.D.S.

In the death of Benjamin C. Lefler, D.D.S., of this city, which took place June 11th, 1869, our profession has lost a most worthy and useful member. Though not so widely known as many who have sought distinction in a more public field, yet his connection with the profession, from the time of his first entering upon its arduous duties, has been one of entire devotion and manly zeal to discharge all its obligations and advance it to its proper place among the liberal professions. He was born in the interior of this State, and, like many of his compeers, had to fight the battle of his early professional life unaided by skillful and experienced preceptors; but at last, owing to energy and perseverance, he had the honor to receive, in the spring of 1853, from the old New York Dental College, established at Syracuse, her assurance that he had thus far done his work well, and henceforth her honors should encircle his brow, to guide him on to a greater field of usefulness. How well the confidence thus reposed in him was placed those who have known him best can most fully attest. He came to this city about the year 1855, and, by a gradual and steady upward course, had succeeded, at the time of his death, in establishing an enviable and lucrative practice, and, more than all, a reputation among his friends for honor, integrity, and professional courtesy, that will outlive the enduring monuments of his skill. His life and death aptly illustrate the poet's beautiful thought, that

> "Honor and shame from no condition rise;
> Act well your part—there all the honor lies."

In private life he was a most warm-hearted and genial companion, of a retiring and modest disposition, generous and noble in every impulse of his nature, and steadfast and true in his friendship. He leaves behind a fond and loving family to mourn his early death, and a circle of warm professional friends, who can illy spare from their ranks one whose record stood so deservedly high. His virtues will live in the memory of all his associates, and serve as a beacon light to those who may come after him, pursuing that hard and rugged path to professional excellence and honor. * * *

New York, June 24th, 1869.

CORRESPONDENCE.

HARD-RUBBER PATENTS.

Dr. S. S. White, Publisher Dental Cosmos:

Dear Sir,—In response to your request that I would write an article which should answer for a reply to the very numerous letters which you are constantly receiving on the subject of hard rubber—Cummings, Newbrough, Simpson, Haering, and Wheat patents—asking what the writers had better do about taking a license from one or all of these parties, I purpose to give the desired information as well as I can at present spare time to do it.

You say truly that it is impossible to answer all the letters of inquirers satisfactorily, and that a great many of them cannot be properly answered at all, because they ask for advice which only learned counsel can give, and for decisions on the validity of patents which can only be made by the courts.

If a sketchy statement of the important points, as they present themselves to me, will relieve you, and satisfy the needs of your correspondents, I shall be gratified.

The standing of several of the claims now urged on dentists to get money from them, is not yet legally settled. It is not our province to prejudge them. Rival patentees are each trying to out-license the other, and offering inducements to those who buy office-rights now, which they say will cost much more if the present offer is neglected.

The Dental Vulcanite Company, of Boston, are the owners of all the Cummings patent, and the Goodyear hard-rubber patent so far as it applies to dentistry.

They refuse to give separate licenses on these patents. They are farming them vigorously. So far as we are informed, there is not at this time any active resisting defense being made against the Goodyear patent; it runs until May 6, 1872—three years more. Whatever other claims may be presented on making plates, attaching teeth, etc., it dominates them all; controlling the making of hard rubber and the product or material itself when made. Without a license under it, no dentist who makes a vulcanite plate is safe from prosecution. Concealment is nearly impossible in such a business, and the system of licensing is such as almost to preclude the chance of clubbing, or one doing the vulcanizing for a number.

Wherever concealment is possible, we do not consider that the claim under the Goodyear patent, as now worked against dentists, has any equity which should restrain any person from pirating it.

Wherever dentists are so situated that one can vulcanize for several, paying royalty on each piece, but license for one only, it seems almost a

duty to do it. A license from any other parties but those who own the Goodyear patent, will not avail to save any dentist, or secure him the right to vulcanize plates until May, 1872.

The claim does not apply to fitting up or packing; it touches only the vulcanizing, or making rubber hard, and the vulcanized product.

The Goodyear patent controls the only known useful method of making hard rubber for mounting artificial teeth yet made public. An injunction can be obtained against an infringer of it if he is within reach of process from a U. S. Court. It has been successfuly litigated, and though never pronounced upon in the Supreme Court of the United States, the suits in district courts have been always in its favor, and made up in such a way as to offer no good chance of obtaining a reversal by carrying them up.

I have said that vulcanite or hard rubber, according to the Nelson Goodyear patent, which has three years yet to run, is the only useful method for dentists.

The Simpson rubber has been decided, on a fair hearing, to be subordinate to the Goodyear patent. I presume it will not be litigated any further. It must be considered an infringement. If it were an improvement upon ordinary hard rubber, it could only be used by the licensees of Goodyear, and that disposes of it so far as the interest of dentists who wish to evade the claims of the Goodyear Dental Vulcanite Company would lead us to give it attention.

The patents of J. B. Newbrough and E. Fagan, granted in October, 1867, and January, 1868, for what is popularly known as "iodized rubber," are entitled to more consideration. I do not hesitate, for myself, to conclude that if the claims of the patentees of the iodized rubber are true—if they can harden rubber which has been iodized with a quantity of sulphur so small as to be clearly under the minimum of Goodyear's formula, and so small that, without the iodine, vulcanization to the extreme of Goodyear's specification will not make hard rubber of it—then it will, on a fair trial, be declared free of N. Goodyear's claim, and a sound patent in itself. N. Goodyear was not the first mixer of sulphur and rubber for the purpose of curing it. He owns the mixture within the limits of his specification, and cannot prevent another person from using a small portion of sulphur in combination with another substance which is not an equivalent.

In May, 1868, an injunction was gained by the Goodyear Dental Vulcanite Company, in Pittsburg, Pa., against Sill & Gillespie and Samuel Musser, restraining them from the use of iodized rubber.

The only argument seemingly worthy of note in this case was the hypothetical position assumed by one of the counsel for plaintiffs.

His assumption was that the iodine mixed with rubber in the Newbrough compound reduced a portion of it to carbon, leaving a certain

small portion of rubber not carbonized or acted upon by the iodine, which combined with the sulphur in about Goodyear's proportion to make Goodyear's hard rubber! Stated more plainly, he claimed that if one pound of rubber mixed with two ounces of sulphur be mixed with iodine and hardened by the process of the Newbrough-Fagan patents, three-quarters of the pound of rubber would be burned to carbon, and the remaining four ounces of rubber would, by the action of the two ounces of sulphur, be Nelson-Goodyear vulcanite, and make the rotten twelve ounces, by its intimate mixture therewith, good, serviceable hard rubber—such as was exhibited in court. On such argument as that his Honor Judge McCandless granted a preliminary injunction. Such a case is difficult to understand. It may have been a "put up" or "cooked" case. Judges do not generally try a case and decide the validity of an original patent on affidavits and loose remarks of counsel. I am the more inclined to attach no importance to this McCandless injunction, because I do not see the Dental Vulcanite Company refer to it in any recent circulars of warning, monition, and terror, which they have issued; and also because in their case against Benoni E. Gardner, of Providence, Rhode Island, six months afterward, they attacked the iodized rubber with the Cummings patent. This in itself might mean much, for the enterprising Josiah will play every card, and leave no stone unturned; but the Hon. B. R. Curtis, of counsel for plaintiffs, in the course of his argument, said: "We decline altogether the issue which has been raised in this case, whether this Newbrough rubber infringes the Goodyear patent. That is a mooted point. That is a question to be tried upon the Goodyear patent. The other side have evidence that they have made a new invention, wholly independent of Mr. Goodyear. Mr. Goodyear and his counsel have evidence that at the utmost they have only made an improvement; and Mr. Goodyear goes so far as to assert and maintain that it is merely a colorable alteration that Newbrough has made. These issues we decline."

In their decision of this case Judges Clifford and Bullock say: "We decline altogether even to make an intimation upon the question whether it does or does not infringe the hard-rubber patent." All which, being spoken in November, 1868, seems to justify the conclusion that the Pittsburg decision is entitled to no consideration.

Before concluding our consideration of the value of this Rhode Island suit between the Cummings patent and iodized rubber plates, I wish to speak of application patents in general, and this Cummings patent in particular.

Application patents are the spawn of speculators who desire to get money without working for it, aided by patent solicitors, who, failing to get the legitimate business of real inventors, have fostered this line of loose patent work. They will get you a patent on anything for their fees. They used to work a claim through by *disclaiming* every-

thing which the examiners of the Patent Office indicated that it *interfered* with. Latterly, the *application* of the invention of somebody else to some use which he had not time to make, or forgot or even thought too frivolous to mention, has been the favorite game of these operators.

The Cummings patent, for the application of hard rubber to make dental plates and gums, was granted June 7, 1864, with the 17 years' term to run. The claim in it is "the plate of hard rubber or vulcanite for holding artificial teeth and gums, substantially as described." On this patent several suits have been brought against dentists. The only one which has gone to final hearing is that against Dr. Wetherbee, of Boston.

This suit developed the whole strength of the patent. The defense was a very able one, and indicates, to those who shall by-and-by be called upon to make a case which will invalidate and break that patent, just what few points were lacking to make its destruction certain. For the present this is not worth, to the dental profession, the expense of doing it, because the same owners are possessed of the N. Goodyear patent (in fact, rely so much on it as to style themselves the Goodyear Dental Vulcanite Company), and will not, as before said, license on it separately.

Neither an individual nor a corporation can be compelled to sell property—be it a patent-right or pickaxe—except on his or their own terms; and if a part of the price of a license to vulcanize is the taking of a license on the Cummings patent, a dentist who wishes a right must take it on the terms of its owners, or let it alone.

If, however, Dr. Newbrough and his coadjutors shall succeed, in the courts, in establishing their right to make their iodized rubber against the assaults of the Goodyear party, then the necessity of fighting the Cummings patent out of existence will become immediate.

That the Goodyear Dental Vulcanite Company have abandoned their original course of action against the iodized rubber, as indicated in the Pittsburg suit, and taken the new stand which they made in the Rhode Island case against Gardner, may indicate their fear that, as opposed by the N. Goodyear claim, the iodized rubber will win; it certainly does indicate their prevision of the necessity of trying to make the Cummings claim broad enough to cover or exclude iodized rubber, and such new substances or improvements.

I have read all the Cummings patents and specifications, and all the testimony, arguments, and decisions in the case against Wetherbee, and do not hesitate to conclude that the position taken in argument of the case of Gardner, is of a new and aggressive character, not indicated by the patent nor assumed in former trials. Cummings' claim is for "the plate of hard rubber for holding artificial teeth and gums."

The Hon. B. R. Curtis, for the owners of Cummings' patent, claims

that "it consists, first, in the conception that this new substance may be usefully applied to produce this new result; and then it consists in devising particular means by which this new substance can be thus applied." Then, going on to deny that making moulds is old; that forming a wax plate is old; that waxing up the teeth and making a counter-mould is old, etc., he claims broadly that in connection with the rubber, or its equivalent, all these old, well-known processes, or stages, in the work of getting up a plate of gold, or porcelain, or gutta-percha, are new, and invented by Cummings; claims that iodized rubber is an equivalent of the Goodyear rubber, and that making a plate of it with Newbrough's rubber infringes Cummings' patent just as much as if Goodyear hard rubber had been used; and on the 25th Nov. 1868, Judges Clifford and Bullock granted a preliminary injunction, restraining Benoni E. Gardner from the use of iodized rubber for making dental plates, because it infringed the Cummings patent.

If, therefore, dentists decide that there is any value to them in iodized rubber, and particularly if it shall be found clear of Goodyear's patent, they will be estopped of its use until the Cummings patent is wiped out. This can be done, if it is attacked in the right way, by competent persons, with money enough to carry it through.

It cannot be that such a patent will stand. The application made by Cummings in 1855 was rejected, and the rejection was not appealed from the examiner to the commissioner, but was quietly acquiesced in. His solicitor even asked permission to withdraw the application and model. For years he knowingly assented to its use; and the growth and development of the business of making vulcanite dentures went on without a word of claim or protest from him. If there was any invention in it; if what there was of invention in it at that time was not Bevins' or Haering's, but Cummings' own, then most assuredly he did abandon it to the public, both by his failure to press his rejected application in the manner provided by the law, and by quietly acquiescing in its use, allowing others to invest their means, and establish themselves in the business, without notifying them in any way of his claim.

Another view confirming the badness of Cummings' patent is, that it was issued not on a renewal or rehearing of his old application, but on a new application, made eight years afterward, and granted at the latter date, with seventeen years to run. It is void, therefore, by law, because it was notoriously in use by the public for more than two years prior to the application for a patent.

Cummings himself is not known to have ever made a piece of vulcanite. No proof that he did, outside of his application and the formal oath which he made therewith, has been made public. His correspondence, and his contract with Bevins, all go to sustain the supposition that he employed Bevins because he (Cummings) had neither the knowledge, the material, nor the apparatus with which the work could be

done. Bevins had the run of Goodyear's factory, and it was the policy of the Goodyears, at that time, to favor and aid the application of their material to new uses; knowing, as they did, that it was the rule of the Patent Office to refuse to grant patents for *application* only, or *second use* of another person's patented invention. A rumor has always obtained in connection with that dental plate application, that Bevins himself could not put up the work or vulcanize it, and that he was aided by a workman of Goodyear's named Robert Haering; that Haering, while Bevins was making experimental failures, did take some impressions, make moulds, procure teeth and fit them, and completely vulcanize and finish one or more artificial dentures with hard-rubber base; that he made for Bevins, who sold it to Cummings, the very piece which was sent to the Patent Office as a model with his first application. Dr. Wheat, some years ago, obtained from Haering an assignment of one-half of any patent which might be granted to him, and then made an application for a patent, putting his assignment on file at the same time. The application of Haering at that time was rejected. Dr. Newbrough, as assignee of Haering for all his claim, succeeded in getting the little job through the Patent Office in January of this year.

It is extremely good fun to read and compare the circulars which Dr. Wheat, Dr. Newbrough, and Josiah Bacon print and send to dentists.

Wheat says the Haering claim is good, and his title to half of it perfect, and on that he offers to sell rights—which he can legally do, as also can Newbrough, if they can get purchasers; while Bacon calls them all very hard names, says the Haering patent is not worth a — vulcanite button, and threatens to make the tariff very high on any one who deals with them.

It does not seem to occur to Mr. Bacon that, in fact, if there be proof that Haering did make a hard-rubber artificial denture before Cummings and Bevins, that would be "priority," and that in law they are both bad patents, both wrongfully issued by the Patent Office, and both void by reason of having been in use by the people for more than two years with the full knowledge and consent of the so-called inventors.

Let "dog eat dog" will do for the dentists if these parties will go to law manfully. Brought fairly to trial, and pitted against each other, one of these application-patents will be bursted.

It is not to be denied that in the profession there is a decided sympathy for Dr. Newbrough, because he is fighting the common enemy, and therefore entitled to it. If he has got from Haering the secrets and details of the work done in Goodyear's factory in 1855, he has the means of breaking the Cummings patent on priority alone. If Haering has been laying back to make a sale, and secure himself before he developed it, we have no right to complain. Josiah Bacon seems inclined to avoid the fair issue of priority, and resorts to the novel course of asking the courts to order the Haering-Newbrough patent to be annulled

for fraud and inadvertent issue. If Newbrough can make the proofs of priority, such a course will not avail against him. They certainly cannot both own it. Light is wanted. Their fight will be apt to make a few holes which will let some in. Whichever one beats the other will be entitled to our thanks.

If Wheat's assignment is regular—and I find no flaw in it on examination of a copy—then he owns one-half, and he and Newbrough must agree to sell together, or agree on a division of territory, and assign to each other within those limits, or each one can use and assign or sell rights, which will be valid. For instance, each could give a single exclusive office right in a certain locality, and both of the titles or licenses would be good. To sum up, the Goodyear Dental Vulcanite Company can only license under Goodyear's patent. A license from any other party under any other patent will not be a protection against the Goodyear claim, if you make hard rubber. You cannot buy a license from the Josiah Bacon firm under the Goodyear patent—which runs until 1872—without taking also a license under the Cummings patent. Yours truly, HENRY COY.

SELECTIONS.

OSTEOPLASTIC.

BY CHARLES JAMES FOX, M.R.C.S., L.D.S.

"IT is some time since any one has given a detailed account of experience with this material. It has now had a pretty long trial; and, perhaps, if the question is raised, some among our brethren may have important facts stored away which they will open to us, if incited thereto. Two things have prompted me to write these few lines. First, a practitioner, of acknowledged skill and repute, wrote me: 'Would you kindly tell me what osteoplastic you consider the best? Could you recommend Stent's?' Secondly, a young American lady, with her mouth like a piece of Mosaic work of *small* gold fillings, not long away from one who is recognized on both sides of the water as a master hand, came to me with the request that I would renew in an incisor an osteoplastic filling which was wasting away. Dr. X—— had told her she should 'have that filling renewed every year.' Well, these two incidents gave rise to some thoughts; and one was, if I put them on paper, perhaps some one else will be induced to 'think aloud,' if we may so express putting pen to paper. As to the first incident, I may be quite wrong as to the inference I drew, but it occurred to me that the first gentleman is so good a manipulator with gold, that he despises everything else, and when unable to use it, he is so conservative that, Ash's excellent amalgam having served him well for years past, he has not cared to risk his reputation for making good fillings upon a substance of which, perhaps, he has only come across some bad specimens. If this does not represent his case, it does that of many others. And, on the other hand, we have a renowned gold filler putting in osteoplastic, and recommending its renewal annually. I have often done that,

and, under certain circumstances, I think it is good practice; but I have always done it with a feeling, Well, if this patient ever crosses the Atlantic, won't our American cousins be down on the 'plasterer!'

"So far for the present. I have simply sought to give a text, perhaps some one will have the charity to supply the discourse."—*British Journal of Dental Science.*

HINTS ON EXTRACTING.

BY W. G. BEERS, MONTREAL, CANADA.

"We should have said in the January number, that we are particular in lancing the gum around both upper and lower wisdom teeth, especially at the farthest extremity, near the tuberosity of the palate bones. We will endeavor to give reasons for this preliminary, and a few final hints on extracting.

"What is the danger of not severing the connection of the gum with the wisdom teeth? When the teeth are remarkably small, as wisdom teeth sometimes are, or when the gum has receded from the necks to a considerable extent, no danger may be apprehended, as in both cases the teeth have but little hold in the jaw; but when they are of the ordinary size, and firm in their sockets, there is danger of tearing away much of the adjacent membrane, and especially a part of the duplicature of the mucous membrane at the posterior edge of the palate bones. At the wisdom teeth the alveolar processes terminate, and the gums are continuous with fleshy folds of muscle and mucous membrane. The liability to fracture of the process or maxillary is lessened at this point, owing to the smallness of the dens sapientiæ roots and the thickness of the bone; but when we consider the usually firm attachment of the gums to the periosteum of the alveolar process of any of the teeth, and the laceration which sometimes occurs, even in cases where the lancet has been employed, it is clear that the wisdom teeth, being more clasped by gum than any other, owing to their anatomical situation, are most exposed to the accident of which we write.

"In the lower jaw, broad and fleshy muscles, continuous with the gum, arise at the side of the wisdom teeth; and the mucous membrane here is much exposed to laceration. We cannot enlarge further upon this subject, but will give a case in our practice. We had to extract a left upper wisdom tooth for a lady. She objected to lancing, but we succeeded in separating the gum on the buccal sides. The forceps was applied; patient perfectly quiet; and the tooth was removed from its sockets; but judge of our surprise to find that, though the tooth was out, and the entire roots exposed to view to their very end, the attachment of the gum was so strong at the posterior side, which we had not lanced, that when the tooth was drawn downward the mucous membrane covering the posterior edge, and even part of the floor of the palate bones, was clearly loosened, and seemed inclined to come away with the tooth. The case was interesting; and before cutting away the gum, which had to be done before the tooth could be safely removed, we assured ourself of one fact, and that was, that the extraction of the tooth would necessarily lacerate a wide surface of membrane of the palate, unless the attachment was severed. This was only one of several cases in our own practice, and we have no doubt but that it is parallel to cases in the practice of others.

"Any thick accumulation of tartar should be removed with a scaler before attempting to extract. Such a deposit may conceal a cavity into which the point of the forceps might crush, and fracture the crown of the tooth: at any time, however, tartar is in the way of the application of the instrument.

"If, in the administration of an anæsthetic, a cork is placed between the teeth to keep the jaws open, it is advisable to tie a strong string to it, in case it should slip down the patient's throat during inhalation. A patient swallowed a cork some years ago, while inhaling nitrous oxide in a dentist's office, and died before it could be extracted.

"We were more than ever struck with the value of stiffly *starched* towels for chloroform during a recent operation, in which Dr. Reddy, of Montreal, proved to our satisfaction, that by their use less chloroform is required, and quicker anæsthesia obtained.

"The eye should follow the removal of a tooth from the application of the forceps to extraction, and the purpose held in view from the beginning. A volume might be written on the position of the operator and the proper application of instruments. Indeed this important part of dental surgery offers a large field for improvement and study, especially in the adaptation of instruments, and the relief to be afforded in the pain of the operation.

"One last word. As surgeons, do we not lack thoroughness, when occasion offers in our operation of extracting under an anæsthetic, when we only remove the teeth? Of what further use in the economy are much of the outer and inner plates, and the transverse septa of the alveolar processes? Why not assist Dame Nature by going over the entire maxillary, after the teeth are out, with cutting forceps, and removing much of the processes? There is little or no pain in this operation if it is done before the gums close."—*Canada Jour. Dental Science.*

DEATH FROM THE USE OF CHLOROFORM.

"On Tuesday evening, about half-past six o'clock, Mrs. Emily Banker, wife of John S. Banker, of Hart's Falls, died suddenly at the house of Dr. Z. Cotton, in this village, while under the influence of chloroform, administered for the purpose of extracting her teeth. The doctor, assisted by his brother, administered chloroform in the usual way, and extracted three teeth. The patient came out all right. He gave her a second inhalation, and extracted nearly all the remaining teeth. This time she rallied, and showed no signs of distress. There being two stumps remaining, she insisted on taking it again, and inhaled the third time. Having extracted the remaining teeth, he noticed that respiration had nearly if not quite ceased. He threw her forward to let the blood run out of her mouth, and, finding no symptoms of returning life, laid her on the floor and attempted artificial respiration, but it was of no avail. Coroner Kennedy was summoned next morning, and a jury empaneled. Drs. James Nelson and O. M. Bump were called in, and gave an opinion that death had ensued by asthenia of the heart from the use of chloroform. The jury rendered a verdict that Mrs. Banker died from the use of chloroform, for the purpose of extracting teeth, and that it was judiciously and properly administered, and that no blame can attach to Dr. Cotton. It might be stated, in addition, that her family physician had advised her that it would be safe, as far as he knew, for her to take chloroform."—*Cambridge* (N. Y.) *Post.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEORGE J. ZIEGLER, M.D.

"*Exsection of the Trunk of the Inferior Dental Nerve, together with that of the Second Branch of the Fifth Pair of Nerves beyond Meckel's Ganglion, for severe Facial Neuralgia.* By Geo. C Blackman, M. D., Professor of Surgery in the Medical College of Ohio, Surgeon to the Samaritan Hospital, Cincinnati.—Mrs. S. J. M., aged about thirty-five years, and mother of six children, had enjoyed good health until 1852, when she began to suffer from 'violent headache and toothache.' At this time she resided in Canada, and was subjected to the most heroic medication without obtaining any material relief. She had also all of her teeth on the left side extracted, the only effect of which was to increase the pain. She consumed such enormous quantities of medicine, and 'so many gallons of laudanum,' to use her own expression, 'that the druggists called to inquire what kind of a woman I was.' In the year 1862, with her husband, she removed to Cleveland, Ohio, where she was treated by regular and irregular practitioners, as she states, without benefit, and in March, 1866, a portion of the left inferior dental nerve near the angle of the jaw was exsected. For some days after this operation, according to Mrs. M.'s account, her sufferings were increased. The pain then subsided, and did not return for several months, when it became more severe than ever, confining her to her bed the whole of the succeeding winter. She states that, so great was her torture, she entreated that the operation should be repeated, but as the first had given only temporary relief, it was declined, and for some nine weeks medication was again resorted to, which, like all previous attempts, failed to produce any benefit. I first saw Mrs. M. in December, 1867, and learned from her the sad history which we have just related. During the half hour that she was sitting in my office, she had two attacks of her terrible paroxysms, lasting from three to five minutes, the left side of her face being drawn into a hideous expression, and the pain extending along not only the course of the inferior dental nerve, but from the upper lip along the branches of the trunk of the second branch of the fifth pair of nerves. The patient informed me, that for the past eleven years, on an average, she had had fifty of these paroxysms in twenty-four hours, during profound sleep, as well as in her waking hours. Her screams at times were frightful, disturbing the rest of all who attempted to sleep in the same house. Her husband, a house carpenter, declared to me, that on this account, he would often be unfitted for his work. When I first saw the patient, she was some seven months advanced in pregnancy. Having learned from herself and husband that everything in the way of medication, likely to afford relief, had been tried without relief, I proposed the exsection of the trunk of the inferior dental nerve, and after recovery from operation, to remove that of the second branch of the fifth pair of nerves, as far as the foramen rotundum. She was ready and anxious to submit to any measure that I might suggest. On account of her advanced state of pregnancy, I advised her to wait until after her confinement. To this she at first assented, but in the course of a few days, so terrible

were her sufferings, she implored me to perform it without delay. Accordingly, January 17th, 1868, at 11 o'clock A.M., at my regular *clinic* at the Samaritan Hospital, in the presence of the class of the Medical College of Ohio, and many physicians, the patient being under the influence of chloroform, I made an incision along the inferior and posterior margin of the base and ramus of the lower jaw, as if for the removal of the bone. The integuments having been detached and reflected, with the bone gouge forceps, chisel and mallet, I removed the anterior wall of the bone to the extent of two or two and a half inches. The opening made by the trephine, in the previous operation, was closed with a dense fibrous tissue, and the space beneath was filled with a fibro-cartilaginous material that rendered it impossible, without delaying the operation, to determine the extent of the repair of the exsected portion of the nerve. I removed the entire portion of the nerve, from its entrance into the ramus, to the mental foramen. The reflected flap was then adjusted, and sutures inserted, the line of the incision falling sufficiently below the base of the jaw to escape notice. This operation seemed to afford considerable relief, yet the distress in the upper jaw continued, of course, as severe as ever. The wound healed kindly, and at the end of a week, the patient feeling so well satisfied with the result of the first operation, begged me to perform the other at my *clinic* that morning. Accordingly, just seven days after the exsection of the inferior dental nerve, I proceeded to perform Carnochan's operation for the removal of the second branch of the fifth pair beyond Meckel's ganglion. The patient was placed on the table, with her head somewhat elevated, and opposite a good light. The operation was then performed, with but unimportant exceptions, as described by Dr. Carnochan in this Journal, Jan. 1858, p. 137.

" 'An incision was now made on the cheek, commencing near the internal angle of the eye, on the inferior edge of the orbit, opposite the anterior lip of the lachrymal groove. This incision was carried downward and slightly outward for about an inch, to a point opposite to the furrow on the lower portion of the ala of the nose ; another incision, which also terminated at this point, was made, commencing about half an inch below the external angle of the eye (in our case an inch and a quarter), opposite the edge of the orbit, thus forming a V incision, in the area of which is situated the *foramen infraorbitale.* The flap thus resulting was thrown upward, and the branches of the second branch of the fifth sought for ; some of these being found, they served as a ready guide to the trunk of the nerve. This was now isolated from the surrounding tissues, up to the point of exit upon the face from the foramen. The lip was now everted, and the mucous membrane detached from the superior maxilla along the line of junction between the cheek and the gum. A sharp-pointed bistoury was now inserted at the apex of the V incision, into the mouth, and carried downward, so as to divide entirely the tissues of the cheek and upper lip, along a line passing midway between the ala of the nose and the commissure of the lips. The two flaps thus formed were now dissected from the osseous tissue beneath, one being reflected outward toward the ear, the other, internally, toward the nose. The whole front wall of the *antrum maxillare,* with the nerve passing through the *foramen infraorbitale,* was thus exposed.'

" In our operation we found these parts sufficiently exposed after the V-shaped flap had been detached and reflected ; therefore we did not

divide the upper lip. After perforating the antrum with the trephine, we removed its anterior wall with the bone gouge forceps, and with the same instrument, of small size, we broke down the osseous canal in the floor of the orbit, without encroaching upon the tissues in the cavity of the orbit. The posterior wall of the antrum was broken down, as in Carnochan's operation, with a small chisel, the nerve fairly exposed, and with long blunt-pointed scissors divided close to the foramen rotundum. The nerve was of a deep red color, and seemed somewhat enlarged. Considerable hemorrhage followed the last steps of our operation, but was controlled without difficulty by means of the sponge. The wound was then cleansed with a weak solution of carbolic acid, the flap brought down, and sutures inserted at various points, leaving, however, a space below sufficient for the removal of the sponge, and the discharge of matter. During the whole of Friday night the patient slept well, for the first time, as she stated, in eleven years. On Saturday her face was a little swollen, and the eye on that side closed. Patient was happy, and yet complained of soreness in upper jaw from the operation, but declared that this was insignificant when compared with her former sufferings. On removing the sponge there was a slight renewal of hemorrhage, and another was introduced and allowed to remain for twenty-four hours. There was no further hemorrhage on its withdrawal; the wound progressed favorably, and unbounded was the joy of the patient at her complete relief. In the course of a few weeks she was delivered of a healthy child and made a fair recovery, but during her confinement in childbed she lost one of her children, and for some months afterward was subjected to afflictions of no ordinary kind, and yet there was no disposition to a return of her old trouble. Just one year after the last operation she presented herself at my *clinic*, and could not find language to express her gratitude for the complete immunity from suffering which she had experienced.

"About the first of February of the present year, however, she did, for the first time since the operation, have a few twinges of pain along the upper lip, on the left side of her face, but these yielded promptly to a dose of compound cathartic pills, and to the present time, May 23d, she remains entirely free from pain, some sixteen months having elapsed since the operation. Mrs. M. informs me that before the operation, the skin on the affected side of the face seemed always cold, and did not perspire, no matter what applications were made, whereas she now not unfrequently notices perspiration at the part designated. Her vision, hearing, smell, and taste, during the whole period of her protracted suffering, remained unimpaired, and she thinks there were no painful points on pressure. The headache, from which, for eleven years, she had been so great a sufferer, has left her since the operation. She thinks that there is a feeling of numbness over the left side of her face which she did not before experience. There is no paralysis of expression whatever, and the deformity, resulting from the incisions through the soft parts, is by no means great, and becomes less from month to month.

"We doubt whether the nerve can be exsected from the infraorbital foramen to the foramen rotundum by any proceeding more easily and effectually than by Carnochan's method. In the *Viertel-jahrsschrift für die practische Heilkunde*, t. ii. 1860, is the report of an operation performed by Linhart, of Germany, in which he attempted to destroy the nerve by Middledorpff's galvano caustic apparatus, and through an

incision limited to the region of the orbicularis palpebrarum and the orbit so to expose the globe of the eye that it could be lifted upward. From the details of this operation, which we have found copied in the *Arch. Gén. de Méd.*, Paris, Nov. 1860, p. 609, we could not be tempted to repeat it. It is stated that as the current was passed from before backward, destroying everything within its reach, to the spheno-maxillary fossa and base of the skull, there was, in the twinkling of an eye, a perfect whirlpool of blood, which filled the orbit, infiltrated the tissues over the temple, and of the neck, so that the carotid was immediately compressed, preparatory to the ligature of that vessel, which it was thought would be required. Pledgets of charpie, saturated with perchloride of iron and the *eau de Pagliari*, were inserted, which, together with the compression, after some ten minutes, temporarily arrested the hemorrhage. On the removal of these it speedily returned, although with less violence, persisting, however, more obstinately in the orbital region, where it only yielded to the frequent application of ice, in addition to the compression. In attempting, however, to dissect out the portion of the nerve passing to the infraorbital foramen, the hemorrhage was again renewed, and required the use of the actual cautery. The origin of all this hemorrhage was, of course, the division of the internal maxillary artery by the electric cautery. No wonder that the editor of the *Archives Générales*, etc., in commenting upon this operation of M. Linhart, so '*laborieuse et accompagnée de dangers serieux*' in its execution, should give his preference to the '*procedé Américain.*'

"Dr. Schuppert, of New Orleans, who has performed Carnochan's operation in two cases with very gratifying results, has kindly furnished me with the details of an operation by Dr. Weinlechner, of Vienna, and which he found recorded in the report on the Progress of Surgery, 1863–1865, by Dr. Gures, of Berlin. Respecting this operation it is merely stated that the patient, aged forty-nine, had suffered from facial neuralgia for nine years, and that the result of the operation was dubious. The same report, says Dr. Schuppert, contains the remarkable case of Dr. Nussbaum, of Munich, which Dr. S. thus translates:

"'A female, aged thirty-eight, suffering from traumatic neuralgia, had numerous dissections made of the supra and infraorbital nerves, during a space of five years before she came under Dr. N.'s treatment. During the next two years repeated extirpations of the cicatrices were made, the common carotid tied, the ascending ramus of the lower jaw trephined, and the inferior dental nerve exsected, with mylo-hyoid and lingualis, causing necrosis of the bone, which had to be removed to the articulation. Five months later the neuralgia returned, when the infraorbital nerve was exsected nearly to the foramen rotundum. This was followed by an osteoplastic resection of the upper part of the superior maxillary bone, but saving the alveolar processes as in Langenbeck's operation. The bones were then replaced and united by the first intention. The pain had entirely ceased up to the time of publication, several months after the operation.'

"Dr. Schuppert thus concludes his report of this case: 'After this you will admit that the Germans do not spare either the knife or saw!'

"Dr. Carnochan remarked in his paper, published in this Journal, Jan. 1858, p. 136, that, in these aggravated cases of neuralgia, such as we have here described, 'the key of the operation is *the removal of the ganglion of Meckel*, or its *insulation from the encephalon.*

Where even a large portion of the trunk of the second branch of the fifth pair has been simply exsected from the infraorbital canal, the ganglion of Meckel continues to provide to a great extent the nervous ramifications, which will still maintain and keep up the diversified neuralgic pain. Besides, the ganglion of Meckel, being composed of *gray matter, must play an important part as a generator of nervous power*, of which, like a galvanic battery, it affords a continuous supply, while the branches of the ganglion, under the influence of the diseased trunk, serve as conductors of the accumulated morbid nervous sensibility.'

"Dr. Carnochan reports his first patient free from neuralgic pain, and enjoying excellent health fourteen months after the operation. The second patient visited the hospital two months after the operation, still free from pain and in good condition.

"The third case is reported Dec. 3, 'not the slightest trace of tic douloureux remaining,' but the operation had been performed not quite one month bofore, viz , on Nov. 5th. It is much to be regretted that the subsequent history of these cases has not been published to the profession. We are informed by Dr. Schuppert that, in both of his cases, 'there has reappeared, at different times, a neuralgic pain, but of such an indifferent character, that neither one nor the other has ever for a single hour been prevented from attending to their business, a condition which, if not satisfactory to the professional fault-finder, is at least so to the men, who are the true judges in such controversy.' Both patients had been great sufferers for many years, and the first patient, about two years after the operation, was in the satisfactory condition above reported, whereas in the second case not quite a year had intervened.

"In the cases hitherto reported the exsected portion of the nerve has been found reddened and enlarged. In the *Dublin Medical Press*, Jan. 22, 1840, Mr. Carmichael, in a clinical lecture on diseases of the joints, refers to a case in which Mr. Adams amputated a leg for diseased ankle-joint, and in noticing the appearances presented, among other things, remarks:

"'But that which was particularly remarkable was the unusual size of the nerves, not only the trunks but the branches being augmented by at least one-third in bulk or diameter beyond their natural dimensions. This is a curious *pathological fact* hitherto unnoticed: THAT THE NERVES OF A PART SUBJECTED TO LONG CONTINUED PAIN WILL INCREASE IN SIZE.'

"Mr. Carmichael must have overlooked the *Treatise on Diseases and Injuries of the Nerves*, of Mr. Joseph Swan, published in London, 1834 (new edition), in which, at page 65, it is thus written: 'The nerves contiguous to a diseased joint are apt to be become much enlarged. In one case of scrofulous disease of the elbow-joint, much pain had been experienced. The ulnar nerve was very much thickened and enlarged as it passed behind the internal condyle of the arm-bone; the median nerve was also enlarged, but not in the same degree.'

"Dr. Carnochan has alluded to the fact that Sir Astley Cooper, among other authorities, believed that in *tic douloureux*, the pain, instead of depending upon increased vascularity and thickening of the nerves, is due to a condition in which they retain their natural color, and are rather diminished than enlarged in size. Dr. Anstie, in his article on *Neuralgia*, published in Reynolds' *System of Medicine*, London, 1868, vol. ii. p. 753, thus concludes a note at the close of his paper: 'It is

only just to Dr. Hanfield Jones to acknowledge that he has long advocated the opinion that nerve pain is invariably, and in all its phases and consequences, an expression of debility of function; an opinion which has been strongly expressed also by myself, not only in the present article, but in many other papers.'

"Dr. Anstie, in his brief reference to the division of nerves in this disease, where it is inveterate, says the subject is rather 'an uninviting one,' but adds that 'the section of a neuralgic nerve, or rather the excision of a piece, is still, I suppose, to be reckoned among the measures which it may be occasionally justifiable to employ, . . . but with such remedies in our hands as the subcutaneous injection of morphia, etc., I cannot see that we need be tempted to perform such an operation for the sake of a temporary alleviation.' Dr. A. doubtless expresses the sentiments of the majority of writers, viz., that the operation is, as Dieffenbach has forcibly expressed it, '*ein Desperationsact der Chirurgie*' (*Die Operative Chirurgie*, Erster Band, p. 846), and from this opinion we are by no means disposed to dissent. Until the present instance, we had but once before been tempted to resort to it, and that was in the case of a painful stump following amputation of the thigh, in which, as we were informed, not less than two reamputations had been performed to rid the patient of her suffering. Instead of amputation at the trochanters, which we were expected to perform, we exsected the sciatic nerve as it passes between the tuberosity of the ischium and the great trochanter, removing some three-quarters of an inch or more of the nerve, with most decided temporary relief; but in the course of a few weeks, if we mistake not, the neuralgia was as severe as ever. The operation was performed some thirteen or fourteen years ago, and we learned some several years afterward that the sufferings of the patient were as great as before the operation. The sciatic nerve in this case was not of a reddish color, and, like all the tissues of the limbs, was atrophied.*

"Add to my case those reported by Drs. Carnochan and Schuppert, with the fact that in the case of Mrs. M. hypodermic injections had been fairly tried with but little effect, we can truly say for ourselves that under similar circumstances, '*desperationsact*,' as the operation may be deemed, we shall not hesitate to repeat it. The cases of excision of the inferior dental nerve reported by Dr. S. W. Gross in this Journal for January, 1868, we need not add, lend the strongest support to the proceeding, as do those which have been furnished us by Prof. Bruns, formerly of Tubingen, in that great work on Surgery the first parts of which were published at Tubingen, in 1859. In the portion entitled *Kau- und Geschmachs Organs*, and under the head of *Therapeut. Wurdigung der Neurotomie*, p. 838, Erst. Band, may be found still further evidence of the relief which had been afforded by this operation."—(*Am. Journ. Med. Sciences.*)

"*Complete Disarticulation of the Upper Maxillary Bones.* By J. H. Salter, M.R.C.S., L.S.A., L.M., A.K.C., etc.—So complicated are the injuries which usually happen to the bones of the upper jaw, that no attempt has ever been made, as far as I am aware, to establish a systematic

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* We have not time at present to examine the question, but are of the opinion that in a similar case to that just related, Dr. Mayo did amputate at the hip-joint, and the patient was cured!

classification of them, or special rules for their treatment. Feeling, therefore, that any addition to the instances already recorded would be acceptable to those who are interested in this subject, I venture to give a short account of a case which recently occurred in my own practice, which, to the best of my belief, is unprecedented in the extent of its injury and subsequent result in the annals of surgery.

"In August last, W. S., a laborer, aged 30, was driving a wagon, when one of the horses suddenly fell and knocked him down, with his head under the animal. The ground was very hard from the previous drought. When first seen he was sensible, though unable to articulate distinctly; his face was bruised and swelled; his lips and teeth slightly apart, the upper jaw projecting somewhat over the lower, and unable by any effort to be closed upon it. There was no great deformity of the general expression of the face. On touching the cheeks, they appeared to contain a quantity of 'loose bones;' on both sides the malar bones were displaced and movable. On laying hold of the upper incisors, the wedge-shape portion of bone corresponding to the position of the superior maxillæ and molars was so movable that the impression conveyed to myself and my assistants was, that, by a forcible twist, the whole could have been brought away but for the attachments to the soft parts. At the articulation of the nasal bones with the frontal and lachrymal, there was a very distinct separation. The floor of each orbit was depressed and freely movable, the left rather more than the right. The entire jaw seemed to be protruded forward, the teeth being abnormally prominent and overhanging. The alveolar ridges and other portions of the bones were unbroken. The horizontal plates of the palate bones were severed from their connection with the vertical, and with their articulation with the internal pterygoid processes of the sphenoid, which could be ascertained, on passing the finger along the roof of the mouth, by their extreme mobility. There were no external wounds beyond bruises and abrasions, though the œdema and ecchymosis were subsequently considerable.

"The appearances above described were clearly made out and recognized by all present, professional and otherwise, and the disarticulation was beyond a doubt, inasmuch as the bones, in their wedge-shape entirety, could be freely moved backward, forward, upward, downward, and from side to side. The separation of the malar bones from their articulation was no less distinct. For a considerable time sense of smell was absent, and the tears, by reason of a slight displacement of the puncta, coursed over the cheeks. At first, hemorrhage from the nostrils was severe. At no time was there any great pain.

"With much time and trouble, I carefully adjusted a gutta-percha casing to the parts. A horizontal slip passed across the upper lip, and exerted backward pressure on the alveolar ridge, to obviate its tendency to eversion. This was joined by two lateral flaps, brought from the top of the head (corresponding with the coronal suture) beside the cheeks, and united with another horizontal slip passing from the back of the head below the occiput to either side, to steady and keep in position the two malar bones. These were carefully padded with strips of spongio-piline, which readily adhered to the gutta-percha when hot. Over all a bandage was put, fixing firmly the lower jaw on the upper by exerting upward pressure. He was fed through an opening of his teeth with fluid food.

"In the course of five or six weeks I removed the gutta-percha apparatus, and put on a starch bandage for another fortnight. It was several months before he could bite solid food. He is now quite convalescent, and very little the worse for his accident, though, as if to bear testimony to the curious nature of the injury, the upper jaw appears to be set slightly askew, and the depressions between it and its articulations are abnormally wide."—(*Medical Times and Gazette.*)

"*Cleft Palate in a little Girl five Years of Age; Operation Successful.* Under the care of Mr. W. Adams, Great Northern Hospital. —This case, for notes of which we have to thank Mr. Phil. D. Hopgood, house-surgeon, was one of cleft palate extending completely through both the hard and soft palates, and associated with hare-lip, leaving a single fissure extending into the right nostril.

"March 3d.—The patient being under chloroform, Mr. Adams performed the usual operation of removing the adjacent edges of the soft palate (preferring to leave the hard palate), and dividing the levator palati. Three sutures were employed, which were found sufficient to keep the edges in good apposition.

"On the fifth day after the operation, the upper suture had given way, and the rest were removed; but union was perfect through central and posterior portions of soft palate to uvula.

"On the ninth day it presented a healthy appearance, and adhesion was good. Granulation and adhesion proceeding favorably at upper portion.

"The gag, or instrument with a tongue-plate, and opening by means of cog-wheels, made by Mr. Fergusson, and recommended by Mr. Thomas Smith, was used in this case."—(*The Lancet.*)

"*Indirect Osteoplasty.*—Prof. Billroth, in a contribution on the results of operative proceedings for favoring the regeneration of bone from periosteum, states that, in diseased conditions of the full-grown hollow bones of adult subjects, the periosteum resembles that found in early life, in being lined by a layer of cells, which may be converted into irregular and luxuriant masses of osseous tissue. This process is observed in cases of ostitis and acute periostitis, particularly in syphilitic subjects, in whom there is a great tendency to the formation of osteophytic growths. The sanguine expectations with which periosteal osteoplastic operations were undertaken have not, however, been fulfilled. In the first place, the surgeon has no power to limit or control the abundant formation of bone-cells from diseased periosteum; and, again, the newly-formed bone after a time contracts like all other regenerated connective tissue, and finally wholly disappears. Artificial osteogenesis may be produced in children, after resection, when the wound heals by primary intention; but it fails in adults, and when the wound remains open for some time, with profuse suppuration. Rhinoplastic operations, in which flaps of periosteum had been detached from the frontal bone, though followed by formation of osseous tissue in the new nose, were ultimately unsatisfactory in their results, in consequence of the absorption of this tissue, and of the formation of an immovable and tense cicatrix on the forehead. The transplanting of periosteal flaps in operation for cleft palate is not approved of by Billroth, in consequence of the great difficulty of the proceeding, and of its slight utility. In cases

of necrosis of the gums from phosphorus-poisoning, success has frequently attended periosteal resection when the formation of new bone was not prevented through profuse suppuration. The formation of a perfect maxillary bone must not be expected: in regeneration of the upper jaw, the antrum is lost, the bone itself is flattened, and the cheek sunken. In resection of joints, periosteal operations, in consequence of the softened and relaxed condition of the membrane, have not resulted in marked success, except in a few cases, in which they were practiced on young subjects, and where healing was perfected without severe symptoms."—(*Brit. Med. Journ.*, from *Allgemeine Wiener Medizin. Zeit.*, and *Amer. Journ. Med. Sci.*)

"*Ranula.*—Dr. Bertin reports, in the *Union Médicale*, a case of *ranula* of Wharton's duct, in a new-born infant; seton applied; recovery. The infant was seven days old when operated on. At birth the mouth was examined for tongue-tie, and nothing abnormal found. When three days old the child nursed with difficulty, and a little prominence was noticed under the tongue. This increased to the size of a small walnut. The diagnosis was *both Wharton's ducts imperforate and distended by fluid secreted after birth.*

"Dr. Bertin infers that the salivary glands are dormant till food is introduced into the mouth of infancy.

"Dr. B. unsuccessfully employed the seton for ranula in a woman, whom he cured with an iodine injection."—(*Boston Med. and Surgical Journal.*)

Absorption of Jaw.—"M. Dolbeau, as reported in the *Union Médicale*, presented to the Imperial Society of Surgery a patient affected with a singular and rare lesion. The first instance of the kind was exhibited by M. Léon Labbé a year before. The subject, aged fifty, without previous disease, and the cause being unknown; also without pain, suppuration, or inflammation, is losing his upper jaw by a process of retrocessive elimination. All his teeth, though quite white and sound, have fallen out; the maxilla is reduced to a triangular shape, with its base directed toward the velum palati; and there is a large opening between the mouth and nasal fossæ. In M. Labbé's case there was paralysis of the motores oculorum. In this patient, with the exception of attacks of keratitis, and double atrophy of the choroid, the general health has been excellent."—(*Ibid.*)

Odontomes.—"*On the Structure of two forms of Tooth-Tumor.* By S. J. A. Salter, M.B., F.R.S. Guy's Hospital Reports.—Adopting the name proposed by M. Broca, '*Odontome*,' Mr. Salter, in this paper, describes two forms of tooth-tumor which the French surgeon omitted from his list, and which are both of considerable interest. The first is a '*tooth-tumor consisting of an hypertrophied aberrant fang*,' and is of very rare occurrence, there being in fact but three examples known; and each of these has, in Mr. Salter's opinion, been misinterpreted, having been described respectively by Forget, Tomes, and Heath, as exostoses. The second form of odontome is of comparatively frequent occurrence, and consists of an '*enamel nodule* or *submerged cusp*' on a tooth-fang. In a supplementary note, Mr. Salter says that he has just seen a description and figures of these odontomes in a recently published German

work by Profs. Heider and Wedl. Mr. Salter's own observations are illustrated with two lithographic plates and three wood-cuts."—(J. A., Jr., *Amer. Journ. Med. Sci.*)

Decay of Teeth in Hooping-Cough.—In treating of the disturbances of nutrition in pertussis (*Med. and Surg. Reporter*), Dr. E. W. Seymour gives the following "case of a child a year old, who, though the attack of the cough was light and of short duration, commenced immediately to lose its incisor teeth and all at once. The nutrition of the teeth was impaired and they commenced gradually to decay, beginning at the incisive edge of the crown; first the enamel would soften off, and then the dentine would assume a grayish-green hue and become of the consistence of hard cheese, and when extracted, each root had a large pulpy ulcer, which had shut off the nutrient vessels and must have been excessively painful. In no other way can I account for the sudden premature decay of teeth in a child so young, than as a sequela of hooping-cough."

Bromide of Potassium in Dentition.—Dr. Salvatore Caro strongly commends the local application of this remedy (*The Medical Record*) to allay irritation of the gums in dentition. He says: "In the most severe cases of odontitis, either with or without ulcerated gums or loose bowels, I have never failed to relieve the child by the local application of the bromide of potassium. Almost immediately after the first rubbing on the gums, from being turgid, swollen, and red, they assume their natural color, and a certain amount of ease is felt. Saliva commences to dribble; and, as if by enchantment, agitation, carpopedal involuntary motion, vomiting, and looseness of the bowels disappear. As the vomiting and diarrhœa in this case are not the consequence of gastro-enteritis, but of an excitement of the stomach and the intestinal mucous membrane, owing to the inflamed condition of the gums, I suppose it will never be cured, either by the scarification of the gums, or by the use of astringents or anodynes; but, as I shall hereafter prove, simply by the use of the bromide of potassium."

"*Tetanus, a fatal Case of, resulting from the Removal of Ten Teeth from the Upper Jaw while under the influence of the Nitrous Oxide Gas.* By H. K. Steele, M.D., Dayton, Ohio.—John E. P——, age 19, of strong constitution, robust and in full health, on the 1st of March last, while under the influence of nitrous oxide gas, administered by a dentist, had ten of the upper teeth removed, for the purpose of having a full artificial set inserted.

"He felt some of the pain of the operation, but was well able to endure it, recovered apparently from its effects, and continued at his occupation, that of farming. On the 7th of March a twitching of the lower lid of the right eye, with a tendency in it to 'draw down,' was observed by himself and friends. On the 8th he applied to the dentist for relief, who made an external application of chloroform, deeming that sufficient. The left eye, however, became similarly affected, and other symptoms were gradually manifested until the 14th, at which time I first saw him (the distance from the city, 7 miles, being probably a reason why I was not sooner called). There was then inability to separate the jaws more than three-quarters of an inch, a spastic con-

traction of the masseter. There was retraction of the angles of the mouth, and an occasional clonic spasm of the muscles of the abdomen.

"Under the influence of a cathartic, with full doses of belladonna and bromide of potas. and ice-bags to the spine, two or three hours' sleep was obtained that night, without, however, relaxation of the jaws, or entire subsidence of the abdominal spasm. On the morning of the 15th there was a perceptible exaggeration of the symptoms, the spasms of the abdominal muscles at times being very painful; deglutition performed with some difficulty; a drop of water falling on the chin, or running down the neck, producing the spasms in their full force.

"Chloroform by inhalation moderated the pain and gave temporary comfort. Atropia was substituted for the belladonna, and cannabis indica for the potas. bromide with morphine, to be given at night.

"March 16th.—Had slept two hours during the night after taking the morphine; but a continuance of it did not maintain relief. This morning the disease is aggravated. He cannot remain in bed, and occasionally has to be raised to a standing position, the spasms affecting all the muscles of the body, that of the extensors predominating.

"From this time onward the disease increased in severity. The thoracic muscles, those controlling respiration, being more affected than the others. There was at no time opisthotonos or emprosthotonos, but the body was powerfully extended to a straight position. He was not able to remain in bed during the last two days, and it was only while there was relaxation of the spasms that he could sit in a chair; the *rest of the time he was held on his feet, and required the windows and doors to be kept open,* which, in the very inclement weather, was of course an aggravation to his disease and precluded all hopes of affording him relief. He died on the 19th almost in a standing position, having just sunk down exhausted by the violence of a spasm. The treatment may be summed up as follows:

"Ice-bags to spine; morphine; chloroform by inhalation; cannabis indica; potass. brom.; belladonna; atropia; extract Calabar bean by hypodermic injection, one-third grain in solution and 1 grain per ore.

"The remedies affording the most relief are in the order in which they are named.

"Chloroform for the last two days affected the respiration dangerously. The hypodermic application of Calabar bean was not in the least beneficial."—(*Cincinnati Lancet and Observer.*)

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"*Influence of Chloroform upon the Temperature of the Body and the Circulation of the Blood.*—A paper presenting an account of Dr. J. Scheinesson's investigations on this subject is contained in the *Archiv der Heilkunde* of Leipzig, running through the first three numbers for 1869. The following are Dr. S.'s general conclusions:

"1. The diminution of temperature in the bodies of those who are under the influence of chloroform is the result of a decrease in the activity of the nutritive process, and consequently of a direct diminution in the heat-producing function.

"2. The insensible perspiration by the skin is evidently diminished.

"3. When a rabbit is placed under the influence of chloroform the tone of the vessels of its ear will become diminished by the action of the chloroform upon their nervous centre.

"4. Under the influence of chloroform the action of the heart is evidently weakened by the paralyzing action of the latter upon the muscular motive apparatus of the organ.

"5. The slowness observed to occur in the metamorphosis of tissue, and the consequent reduction of temperature observed in the bodies of those who have been subjected to the narcotism of chloroform, are due evidently to the slowness with which the blood circulates, because of the crippled propulsive power of the heart."—(D. F. C., *Am. Jour. Med. Sci.*)

Carbolic Acid in Ulceration.—"Dr. Roe has been for some time in the habit of using carbolic acid as a local application in cases of ulceration of the os and cervix uteri, and has found it to yield results superior to any other topical treatment which he has tried. He has used it in cases where the whole round of other applications has been unsuccessful, and always with the most happy results. He agrees with Dr. Roberts, of Manchester, in considering it a caustic, which, as regards its severity, may take intermediate rank between the nitrate of silver and strong nitric acid, besides acting as a disinfectant, a matter of no small importance in these cases. Dr. Roe does not use it in as strong a form as Dr. Roberts, and does not consider the strong acid necessary in very superficial ulcerations. A mixture of one part of the strong acid with two of olive oil seems to answer all ordinary purposes; but in cases of very deep ulceration the use of the strong acid may be called for. In such cases Dr. Roberts desires the acid to be liquefied by the addition of a very small quantity of water. This has not been found to answer the purpose in the Coombe Hospital, but it has been there discovered by Mr. Weir, that the addition of a few grains of camphor will dissolve the acid, and will, moreover, prevent it again becoming solidified, even at a freezing temperature."—(*Medical Press* and *N. O. Jour. of Medicine.*)

Removal of the Odor of Carbolic Acid.—A correspondent of the *Lancet* says: "The disagreeable odor left by carbolic acid can be readily removed by means of chloride of lime or Condy's fluid."

Oxygen from the Atmosphere.—"Messrs. Montmagnon & Delaire produce oxygen from the atmosphere by means of charcoal and water, or by saline solutions. They state that 100 litres of fresh charcoal, when exposed to atmospheric air, will absorb 925 litres of oxygen and only 705 litres of nitrogen. If the charcoal so saturated with gas is then saturated with water, there will be expelled 650 litres of nitrogen and only 350 litres of oxygen. Thus 575 litres of oxygen and only 45 litres of nitrogen are left in the charcoal. These gases they remove by the means of an air-pump, when the charcoal is again ready to absorb oxygen and nitrogen from the air. The oxygen thus obtained is pure enough for all ordinary purposes, but the cost of procuring it by this method has not yet been practically determined."—(*Medical and Surg. Reporter.*)

"*Bread-making.*—Baron Liebig has just made some important researches on a new method of bread-making. He remarks on the

stationary character of this art, which remains to the present day much in the state in which it was thousands of years ago. He dwells upon the sanitary importance of the mineral constituents of grain, and the necessity of a sufficiently abundant supply of them in bread. These are best found in certain kinds of black and brown bread, which are, therefore, more wholesome than the white bread that is nevertheless preferred by most people (especially by the lower orders), on account of its better appearance and superior palatableness. The problem has hence arisen, how to provide a beautiful white bread which shall contain all the essential mineral constituents of black bread. These mineral constituents (phosphate of potash, lime, magnesia, and iron) are introduced into the bread by the use of the baking-powder invented by Professor Horsford, of Cambridge, in North America. This baking-powder consists of two powders—the one acid, the other alkaline. The acid powder is phosphoric acid in combination with lime and magnesia; the alkaline powder is bicarbonate of soda. Two measures, made of tinned iron, the larger one for the acid powder and the smaller one for the alkali, are employed. When bread is required to be made, every pound of flour is mixed with a measure of the acid powder and a measure of the alkali powder, and sufficient water added to make dough, which is presently made into loaves and baked. In one and a half to two hours bread may be made by this process. The chemical change which takes place will be easily intelligible; carbonic acid is generated and phosphate of the alkali is formed at the same time. The essential feature in Horsford's invention is the economical getting of phosphoric acid in the shape of a dry, white powder. This is done by taking bones, burning them, and then treating the well-burnt bone-earth (which consists of phosphate of lime and magnesia) with a certain quantity of sulphuric acid, so as to remove two-thirds of the lime and leave a soluble superphosphate of lime. The sulphate of lime, which results from the action of the sulphuric acid, is separated from the rest by filtration, and the solution subsequently concentrated by evaporation, and, when it becomes very concentrated, is mixed with a certain quantity of flour, and dried up. The mixture of flour with the superphosphate admits of being reduced to the finest powder, and constitutes the acid powder just referred to. It will be observed that the alkali powder contains soda, whereas potash is required in order to furnish the right kind of mineral salts. Liebig proposes to rectify this defect by using a certain quantity of chloride of potassium along with the alkali."—(*British Med. Jour.* and *Boston Journal of Chemistry.*)

"*Fish as an Article of Food.*—Professor Agassiz, in his address before the Committee of the Legislature of Massachusetts, on the propagation and preservation of fishes, says, as reported in the *Boston Journal:* 'The fish enters largely into the requisitions of the human system. It is a kind of food which refreshes the system, especially after intellectual fatigue. There is no other article of food that supplies the waste of the head so thoroughly as fish diet; and the evidence of it is in the fact that all the inhabitants of the sea-shores the world over are the brighter population of the country. Fish contains phosphorus to a large extent, a chemical element which the brain requires for growth and health. He would not say that an exclusive use of fish would

make a blockhead a wise man, but that the brain should not be wanting in one of its essential elements.'"—(*St. Louis Med. Reporter.*)

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"*Excitement a Disease of Society.*—This country is greatly benefited by German immigration. The peculiarly philosophical tendency of the German mind, the calm patience with which it investigates all questions of importance, the independence with which it rejects what it considers false, and asserts what it believes to be true, are elements of character and good citizenship anywhere, but are particularly valuable in a mixed population like the American.

"In a recent conversation with a German friend upon the state of modern society, he made the following very forcible remark: 'Excitement is disease. Man does not need it. He ought not to have it. What a healthy mind most craves is placidity; to do its work in perfect calm, without any stimulus except that afforded by perfect bodily health. Mind and body healthy, each will give all the stimulus the other needs without resort to artificial means.'

"There is so much meaning in this that it will bear considerable amplification. Mental dissipation and physical debauchery are alike disastrous in their effects; alike breed a fierce appetite for more, an appetite that will not be appeased except by deeper and deeper drafts, which finally ruin body, mind, and soul."—(*Scientific American.*)

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"*Pocket Spectroscope.*—The most perfect and beautiful instrument of this kind which we have seen has recently been constructed by Mr. Browning, with the aid of glass of unusual density. It is only $3\frac{1}{2}$ inches long and $\frac{5}{8}$ths of an inch wide. The opening and closing of the slit is effected in a very ingenious way, by rotating a brass terminal rim. A surprising number of lines for so small an apparatus can be seen on directing it to a bright portion of the sky, and the definition is sharp and clear. When used against a light sky, the slit only requires to be open to the extent of 1—300″ or less, and a very curious effect is produced in the dirty atmosphere usually found, even on clear days, in and near the metropolis. If the adjustment for focus is made by pulling the adjusting slide *out*, enough floating atmospheric particles are sucked in to stop all vision; but by adjusting in the opposite direction, and thrusting *in* the slide, the dirt particles are blown out, and plenty of light appears. This instrument can easily be adjusted to the microscope, and possesses power enough for a considerable range of observation."—(*Student and Intellectual Observer.*)

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Zinc and Iron Alloy.—"Molten zinc dissolves iron, and the zinc in commerce, from its having been melted in iron vessels, always contains some of this metal. To the presence of iron in zinc is due the fact that zinc, as ordinarily manufactured, dissolves much more readily in acid than pure zinc. Dr. Oudemans has determined what amount of iron can be taken up by zinc. He had occasion to examine a metallic mass that had collected at the bottom of an iron vessel where zinc had been kept melted during the space of many weeks, and which, by its high melting point, had become useless for the purposes of manufacture. The fracture was fine and lustrous, though very different from that of

pure zinc—was much whiter and more jagged. It dissolved in dilute sulphuric or hydrochloric acid with considerable violence, and contained 4·6 per cent. of iron."—(*American Artisan.*)

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"*Sponge Gold, capable of Welding while Cool.*—According to Dr. Charles T. Jackson, of Boston, he has discovered a method of manufacturing sponge gold by adding to a concentrated solution of chloride of gold a small quantity of oxalic acid, and then a sufficient quantity of carbonate of potash to dissolve nearly all the oxide of gold, and then adding a large quantity of crystallized oxalic acid, and boiling the solution. All the gold is thrown down in a spongy mass, which, on being washed, is quite pure, and when pressed or hammered becomes quite solid."—(*Journal of Applied Chemistry.*)

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"*To Deodorize Vulcanized Rubber.*—Cover the articles of rubber with charcoal dust, place them in an inclosed vessel, and raise the temperature to 94° F., and let it remain thus for several hours. Remove the articles, and clean them from the charcoal, and they will be found to be free from odor, and not in the least changed in form."—(*Ibid.*)

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"*Hydrofluoric Acid in Glass Bottles.*—Glass and porcelain vessels may be made to hold hydrofluoric acid by carefully cleaning and heating the vessel, into which is then introduced a sufficient quantity of paraffine, and when the latter is melted, moving the vessel in such a manner that the whole internal surface is covered, when the excess of paraffine is poured off. It will be recollected that this acid will not act upon paraffine."—(*Ibid.*)

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"*Hydrofluoric Acid.*—A melancholy instance of the poisonous effects of this acid was recently made known in France. Professor Nickles, of Nancy, one of the most genial and accomplished of the French chemists, lost his life by breathing the fumes of hydrofluoric acid, while attempting to isolate fluorine. It has long been known as one of the most powerful and dangerous of all the acids, and the boils produced by its external application have taught chemists to be very careful in its use."—(Prof. C. H. Joy, *Journal of Applied Chemistry.*)

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"*Ink for Writing on Glass.*—A solution of fluoride of ammonia is recommended as furnishing a ready means of writing with a pen of any kind upon glass, and is especially adapted for labeling bottles, cylinder-tubes, etc., in the laboratory, as well as for marking the degrees upon hydrometers and apparatus of similar construction."—(*Amer. Artisan.*)

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Acid Proof Cement.—Robert F. Fairthorne writes to the *Franklin Institute Journal*, that he has " found the best preservative of cork exposed to the action of the fumes from boiling nitric acid, to consist of a coating of silicate of soda and powdered glass. The cork having been bored to suit the size of the tube, was soaked for two or three hours in a solution of silicate of soda, consisting of one part of commercial concentrated solution, to three parts of water. The tube was next inserted, and when dry the cork was covered with a paste made

by mixing the condensed solution of the silicate with powdered glass in such proportion as to form a mass of about the same consistence as that of putty. This is spread on the under surface, and then washed with a solution of chloride of calcium. It soon hardens, so I think it advisable to make the connection with the flask while the paste is in a plastic state, and to allow it to become solid before applying heat to the vessel containing the acid.

"Corks protected in this manner were but slightly acted upon, though remaining over the boiling nitric acid more than four hours, and over hot acid for ten. In some instances, when not entirely covered, the vapor softened the cork beneath the silicate to the depth of about a quarter of an inch, but the cement proved sufficiently strong to form a compact diaphragm, enabling the tube to be removed from the flask without danger of the fluid contained being contaminated. I would suggest also the application of this cement as a luting for chemical apparatus for general use, as I find that it remains unaffected even when immersed in strong nitric, sulphuric, or muriatic acids. The immersion in these liquids was made while the plaster was still soft, with the only perceptible effect of hardening the same immediately."

"*Cement for Iron and Stone.*—M. Pollack, of Bautzen, Saxony, states that, for a period of several years, he has used, as a cement to fasten stone to stone and iron to iron, a paste made of pure oxide of lead, litharge, and glycerin in concentrated state. This mixture hardens rapidly, is insoluble in acids (unless quite concentrated), and is not affected by heat. M. Pollack has used it to fasten the different portions of a fly-wheel with great success; while, when placed between stones, and once hardened, it is easier to break the stone than the joint."—(*Chemical News.*)

"*Hardening of Hydraulic Cement.*—In order to test the truth of the different hypotheses made concerning the cause of this, A. Schulatschenko, seeing the impossibility of separating, from a mixture of silicates, each special combination thereof, repeated Fuchs' experiment, by separating the silica from 100 parts of pure soluble silicate of potassa, and, after mixing it with fifty parts of lime and placing the mass under water, it hardened rapidly. A similar mixture was submitted to a very high temperature, and in this case also a cement was made. As a third experiment, a similar mixture was heated till it was fused; after having been cooled and pulverized, the fused mass did not harden any more under water. Hence it follows that hardening does take place in cement made by the wet as well as the dry process, and that the so-called over-burned cement is inactive, in consequence of its particles having suffered a physical change."—(*Journal of the Franklin Institute.*)

Tempering small Steel Springs.—The *Scientific American* says that "small springs can be tempered, in large quantities, by first hardening them in water in the usual manner of hardening steel, then placing as many as convenient in a vessel containing oil. Heat the oil containing the springs until it takes fire from the top, then set off the vessel and let it cool. The springs when cooled will be found to have the proper temper."

THE

DENTAL COSMOS.

NEW SERIES.

Vol. XI. PHILADELPHIA, SEPTEMBER, 1869. No. 9.

PHYSIOLOGICAL ACTION OF NITROUS OXIDE GAS.

BY THOMAS W. EVANS, M.D., D.D.S., PARIS, FRANCE.

(Continued from page 290.)

Local Action on the Nervous System.—In my article in the June number of the Dental Cosmos, I spoke particularly of the local action of nitrous oxide upon the blood, and it may be remembered by the reader that the conclusion drawn from experiments made with the gas, as well as from the analogous effect of ether and chloroform upon the blood, was, in brief, that nitrous oxide, so far from being an oxygenating agent when passing by the lungs into the circulation, does not even alter in any way the chemical character of the blood, but that its absorption is probably followed by changes of molecular condition in the elements of the blood—changes which may finally modify, or even arrest, the organic processes determining the evolutions of structure and force. We have reason for believing that blood which has absorbed a certain proportion of nitrous oxide gas, can no longer perfectly maintain those vital functions which are dependent upon it—functions which, in their aggregate, are equivalent to life. We may consequently infer that nitrous oxide exerts a powerful direct action on the blood.

It is my purpose in the present paper to consider if this direct action is limited to the blood; whether the nervous phenomena following the administration of the gas are immediately attributable to certain alterations in the properties of the blood elements, or are to be ascribed to a direct and specific action of the gas upon the nerve tissue itself.

It is a little singular that the alternative modes of action I have just referred to are advocated—the first, by nearly all the English writers upon anæsthetics (chloroform and ether), the second, by nearly all the French writers upon the same subject.

The theory that anæsthesia is caused by "an altered blood"—a blood so changed, either as regards its properties or as regards its quantita-

tive presence in the capillaries, as to be incapable of maintaining in a working state the nervous system, and more especially the centres of conscious sensation, is based upon the apparent action upon the blood—either direct or indirect—which all anæsthetics have the power of producing. The process of oxygenation is always finally more or less interfered with by the introduction of anæsthetics into the system, and the rate of the elimination of carbonic acid is also finally reduced, as well as the rate of the blood-flow through the capillaries—while, as it were, to complete the evidence, whatever may suspend the general oxygenation of the blood, or the local oxygenation of the tissues, is speedily followed by general anæsthesia, or local insensibility. Thus, the inhalation of nitrogen is as surely productive of general anæsthesia as the inhalation of chloroform, while the arrest of the circulation through the blood-vessels of a tissue is an efficient cause of local insensibility. This theory is simple—reducing, as it does, the *modus operandi* of a number of very dissimilar agents to a single effective cause—*asphyxia.*

The theory that anæsthetics produce their effects by acting directly upon the nervous system, is founded principally upon the essential character of the phenomena, both subjective and objective, which their administration occasions, as well as upon the distinctive differences apparent between the phenomena following the inhalation of chloroform, nitrous oxide, etc., and those developed by causes productive of asphyxia alone.

"In ordinary asphyxia," says Flourens, "the nervous system loses its power under the influence of black blood—of blood deprived of oxygen. In etherization the nervous system *first* loses its power under the influence of the special agent which determines it. Herein lies the difference."

I have already fully indicated this difference, and shown how fatal it was to the theory which would regard asphyxia and anæsthesia as equivalent conditions.

It is an unquestionable fact that all the causes of simple asphyxia produce nervous disturbances, and a suspension of the animal functions, much less rapidly than nitrous oxide; while it is almost equally clear that the vapors of ether and chloroform begin to produce their special effects upon the nerve centres some time before the process of hæmatosis can have been in any way interrupted. Rabbits rarely or never die in an atmosphere of nitrogen in less than four or five minutes, while Mr. Erichsen states that, on an average of about twenty experiments made upon dogs, the contractions of the ventricles continued for nine minutes and a quarter after the trachea had been closed.

Now, not only does nitrous oxide, when inhaled by these animals, almost immediately give rise to peculiar physiological manifestations, and within a period of time often not exceeding half a minnte produce

insensibility, but life itself is compromised more rapidly than it is by the exclusion of atmospheric air.

The fact that whatever renders a proper oxygenation of the blood impossible may occasion a series of anæsthetic phenomena, is no proof that ether, chloroform, nitrous oxide, etc. produce their effects solely by acting in that way. Deprive an animal of oxygen, and it dies. But systemic death, when not instantaneous, commences in the life relation. The brain and spinal cord die first. The centres of organic life are the last to lose their powers of functional activity. We are justified, therefore, in inferring that the insensibility consequent upon a want of oxygen is *pseudo*-anæsthetic, except in so far as it may be occasioned by the presence of carbonic acid. But the uneliminated carbonic acid, which accumulates in the blood whenever the supply of oxygen is insufficient, acts precisely as would the same quantity were it introduced through the lungs from without; and, as we have already seen, there is no reason for believing that carbonic acid acts, when it produces insensibility and paralysis, in any other way than by a direct interference with innervation—the way common to all the well-known anæsthetics.

That "narcosis is due, not to the influence of a circulating poison, but to the influence of an altered blood,"* is a statement, admitting the quotation to express a well-formed idea, which it would be impossible to sustain by evidence. It is certainly true that anæsthetics may change some of the properties of the blood with which they are brought in contact, but it is also quite as easy to believe that they directly affect the processes of innervation, as that the nervous functions are interrupted only secondarily. Chloroform, ether, alcohol, and their allies, when once introduced into the blood, are carried along in its current in a free state, and it is unreasonable to suppose that the modifications which they effect are limited to the vehicle by which they are transmitted. Finally, such a supposition is supererogatory, as it is quite as difficult to understand how certain *unknown* physical changes in the blood should suspend the functions of the nerve centres, as to understand how these functions may cease when the centres are subjected to the direct contact of certain gases and vapors.

An interruption of the circulation in any part of the system is soon followed by local insensibility in the tissues from which the blood supply may have been withdrawn; and it is also true that during the anæsthetic state the circulation of the blood through the whole capillary system becomes sluggish. A tendency to stasis begins to appear, while at the same time the supply of arterial blood is considerably reduced. These are facts of direct experimentation, which has

* On Chloroform, Sansom, p. 55. London, 1865.

also been employed to furnish the proof that the brain itself was during the period of anæsthetic insensibility in a state of comparative anæmia. But the inference which has been drawn from these facts is unwarrantable. It is perfectly evident why an interruption of the circulation of the blood should produce insensibility, but it is equally evident that a paralysis of the nerve centres must be followed by vascular modifications in the tissues under their control.

Again, no fact of physiology has been more perfectly established than that the rate of the circulation as well as the quantity of blood in the organs of the body vary as those organs are in a state of action or repose "During their period of action the organs receive much blood; during their period of repose they receive much less. Anæsthesia being a suppression of sensibility, certainly represents for the sensitive nervous system a period of absolute repose. It is hence entirely natural that it should be accompanied by an anæmia of the brain."* And it is important to observe that the reduced cerebral vascularity accompanying the exhibition of anæsthetics does not exceed that common to organs in a state of repose, and does not exceed that obtaining during ordinary sleep.

In brief, it is most probable that an arrest of the capillary circulation through the brain, to which several writers have attributed a potential influence in the causation of anæsthesia, is simply, so far as it may exist, a *result* of the anæsthetic state.

But the theory that anæsthetics act directly upon the nervous system finds its strongest support in the character of the physiological phenomena immediately consequent upon their administration. In the human adult scarcely twenty seconds pass from the commencement of an inhalation of nitrous oxide before the brain, I might say the whole nervous system, begins to become conscious of the action of the gas. The rate of the circulation is accelerated, and not only is the cerebrum excited, but there is an exaggeration of all the special sensibilities. This period of nervous excitement is short, and if the inhalation is carefully conducted, and the subject is well acquainted with the mode of using the gas, expels the air from his lungs before commencing the experiment, takes full inspirations of the gas, breathes regularly and slowly, even less than a minute may have expired before the development of unconsciousness and insensibility. Now, it is absolutely impossible to produce these rapid transitions, from one physiological state to another, by depriving the subject of atmospheric air. The respiration, as we all know, can be suspended a minute or a minute and a half without any sensible effect upon the nervous centres. Indeed, it is difficult to understand how any one, who might have even once witnessed an exhibition of

* Claude Bernard, Revue des Cours Scientifique, No. 21, April 24, 1869.

nitrous oxide, could have imagined an identity between its effects and those occasioned by a want of oxygen, whether such effects are occasioned either directly or indirectly. As I have observed, during the inhalation of nitrous oxide, ether, chloroform, etc., more or less asphyxia, either general or local, is produced; but such asphyxia is only an accident or incident of administration, although it may ultimately co-operate with the special anæsthetic employed in the production of insensibility.

Another fact may be mentioned. Anæsthesia involves not only an abolition of conscious sensation, but an abolition of ganglionic sensation as well. Hence it becomes impossible to excite reflex movements in an animal or any portion of an animal narcotized by anæsthetics. But the anæsthetic narcosis of any portion of the spinal cord may not interfere in the least with the perfectly free exercise of the power of voluntary movement.

For example, let a ligature be passed immediately under the anterior extremities of a frog, upon a level with the bifurcation of the aorta, in such a manner as to embrace all the soft parts of the body except the spinal cord, and to interrupt the circulation between the two parts of the body separated by the ligature. Now, M. Claude Bernard has shown that if chloroform be introduced into the posterior part of the body, insensibility is produced throughout the whole of the portion of the body which receives its sensitive nerves from the chloroformized section of the spinal cord, while the head and superior extremities, placed out of the reach of the chloroform, are unaffected. The pinching of the posterior extremities occasions no reflex movement. The sensitive centres of the part of the spinal cord below the ligature are unconscious, and are therefore unable to react upon the motor nerve fibres. But the animal may be still quite able to execute voluntary movements with the lower half of his body. To prove that the motor filaments have not lost their power, it is only necessary to excite the sciatic nerve by an electric current to produce movements in the corresponding leg, quite the same as in a sound frog. We have in these phenomena the evidence of a special elective action tending to the *sensitive* elements of the nervous system. I cannot forbear here to state that this tendency to a limitation of the action of chloroform to the nerves of sensation has a most important bearing explanatory of those states of consciousness, effective volition, and intelligence, which are occasionally observed co-existing with the most complete insensibility to pain, on the part of etherized patients subjected to severe and protracted operations. The anæsthetic effect, whatever the agent employed, rarely reaches primarily as a function arresting force beyond the medulla oblongata or the *sensorium commune.* It follows that the usual abeyance of the cerebral functions is largely a superadded phenomenon consequent upon the lesion or lesions to which the unity of the organism is temporarily subjected through the abolition of sensory power.

But to return to the further development of the particular thought I have in mind. It curiously enough happens that there is a well-known toxical substance which produces physiological effects upon the nervous system, which have a most interesting relation to those just described. Curare possesses the property of paralyzing the motor nerves without impairing the functional potentiality of the nerves of sensation.

Having prepared a frog as already pointed out,—by passing a ligature around the aorta and all the blood-vessels,—on introducing a little curare under the skin, near the head, gradually the whole half of the body above the ligature yields to the effects of the poison and becomes powerless. But if the skin is pinched anywhere upon this motionless part, the activity of the posterior extremities is often so excited as to cause the animal to jump, pushing before him the anterior half of his poisoned and inert body. In other words, curare has a special elective affinity for the *motor* elements of the nervous system; an affinity manifested by a loss of the functional power of those elements.

Strychnia has a similar elective affinity for the motor elements of the nervous system. But the action of strychnia is manifested in an antagonistic sense: the functional activity of the motor elements is powerfully excited.*

Some interesting experiments were performed recently by MM. Maynan and Bouchereau before the *Société Thérapeutique de Paris*, for the purpose of showing the different physiological effects produced upon the nervous system by alcohol and absinthe. When rabbits and guinea-pigs were made to breathe the vapor of alcohol, the phenomena of anæsthesia were soon developed; when the same animals were made to breathe the vapor of absinthe, the invariable result was the production of epileptiform convulsions. Thus alcohol was shown to exert a specific influence upon the sensitive centres, while absinthe was shown to exert a specific action directly upon the motor centres.

A consideration of the differences in the nervous phenomena produced by toxical agents—differences which are justly attributable to the elective affinities of each for the elements of special centres—opens a most interesting field of study, whether regarded from a physiological or from a therapeutic point of view. My principal object, however, in presenting the preceding facts, as I have somewhat in detail, has been to establish an important inference. I believe that, in view of the physiological effects of chloroform, curare, strychnia, etc., the only logical conclusion we can draw is, that if curare or strychnia, when circulating in the blood, acts as a specific poison upon the cellular elements of the nervous tissue, so also does chloroform.

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* Taylor on Poisons, p. 722. London, 1859.

But it is almost superfluous to endeavor to establish deductively the direct influence of anæsthetics upon the nervous system, so long as such an influence can be most unequivocally proved. Chloroform, ether, carbonic acid, etc. act, when applied to living tissues, as local anæsthetics. They possess properties in this respect common to the narcotics in general. Müller, many years since, established the fact that, when the principal nerve of the thigh has been narcotized by immersion in a solution of morphia, the limb becomes insensible to galvanic stimulus applied anywhere above the point of narcotization. Now, when aconite used locally produces numbness of the skin ; or belladonna, dilatation of the pupil; or carbonic acid assuages the pain of cancerous ulcerations; or chloroform obtunds cutaneous sensibility, such action must naturally be considered as the consequence of some direct influence upon the peripheral nerves.

That these substances have a special influence upon the nerves by local contact, is clearly indicated by the persistence of the diminished sensibility after their application may have been suspended. Did the local, nervous insensibility which they occasion depend upon the blood being "altered" by their presence, such insensibility could only be exceedingly transient—would always disappear immediately after the "altered" blood had escaped from the capillaries into the general circulation.

Again, I may remark that ether not only possesses the property of acting directly upon the nervous system, but that it seems to destroy all those movements of organic life which are dependent upon any sort of irritability. In 1849, M. Clemens noticed that ether had the property of suspending the movements of vibratile epithelia; and M. Gosselin has since observed, that in the bodies of executed criminals, inhalation of ether immediately arrests these vibratile movements, which usually continue from twenty-four to forty-eight hours after death. Michael Foster also tells us, in a recent lecture, that the rapid strokes of the cilia which cover the membrane of the frog's throat, are almost instantly arrested by chloroform, although they seem to be but slightly affected by the presence of most poisons. As might be inferred from Mr. Huxley's theory of the substantial identity of animal and vegetable protoplasm, these devitalizing effects of ether and chloroform are not limited to the primitive evolutions of animal life.

The vapor of ether destroys the motor power of the sensitive plant (*Mimosa pudica*), as well as those movements peculiar to the stamens of the barberry and a few other flowers. In all these cases the anæsthetic exerts an incontestably direct action upon the irritability special to certain organized tissues.

I am very ready to admit that the direct effects of ether and chloroform upon the peripheral nerves are scarcely as well pronounced as might be

inferred. But the skin and most of the animal tissues possess only a very limited capacity for absorbing these agents, which are again, for the most part, rapidly thrown from the capillary vessels into the general circulation.

Moreover, no interference with the functions of the nerves of sensation ever manifests its action in a centripetal sense, beyond the point or points primarily implicated. If a nervous branch is narcotized at any point in its course, only those portions of the nerve below that point are deprived of their functional properties. On the other hand, the anæsthetic narcotization of a ganglionic centre involves a loss of functional properties in all the peripheral afferent nerves subordinated to it. Thus, if a nerve is locally etherized, its point of origin in the spinal cord remains unaffected. Now, if this point of origin be etherized, the portion of the spinal cord below the point will also be etherized, together with all the nerves afferent to it; but the portion of the cord above the etherized point will remain unaffected. This fact is, however, best illustrated by etherizing, through the blood, the lower half of the spinal cord, which can be done in the case of a frog by putting a ligature about the middle of the body on a level with the sacrum. All circulation between the two halves of the body is thus cut off. Now, on introducing chloroform into the posterior half of the body, that half is reduced to an anæsthetic state while the anterior half is unaffected. But if the chloroform be thrown into the anterior half, not only is that portion of the frog rendered insensible, but the posterior half is rendered equally insensible, although the only communication existing between the two portions of the frog's body is that established by the spinal cord. The inferior part of the spinal cord has no power to communicate its anæsthesia to a superior portion, nor has the spinal cord, as a whole, any power to communicate its anæsthesia to the medulla oblongata, while any superior section of the cerebro-spinal axis has the power of transmitting its anæsthesia to the whole of the nervous system below it. Not only this, but the general insensibility which follows the etherization of the cerebro-spinal axis obtains in the skin before the deeper tissues are much influenced, and the extremities—the posterior limbs in a remarkable manner—are not only the first to lose their power of reflex action, but they are also the last to regain it.

It naturally follows that the anæsthetic influence is centrifugal—that general anæsthetics act not only directly upon the nervous system, but that they act primarily upon the great nervous centres—the insensibility of the peripheral nerves being principally occasioned by the paralysis of the nerve centres in which they have their origin.

As regards the ultimate character of those local changes produced by the direct agency of anæsthetics upon the elements of the nerves, but little can be definitely known. Many years ago MM. Good and Pap-

penheim supposed that ether produced its effects by acting chemically upon the nervous system. This opinion was founded principally upon certain structural changes, which they fancied they had revealed with the microscope, in the nerve tissues of etherized animals. These organic alterations of nerve tissue have never been detected by other observers, while the transient character, and the march of all the phenomena of the ethereal sleep, are quite sufficient to show the impossibility of such alterations and the inexactitude of this theory of chemical action.

The changes which do occur are manifested by a diminution of functional activity in the nerve elements, and are probably limited in their nature, as in their effect, to a loss of power. Certain definite conditions or forces are necessary to the accomplishment of the lowest vital or physical transformations, and a change of condition—the presence of a new force—will at once arrest the special phenomena, whatever they may be, and give rise to a new dynamic state, or to a new series of dynamic movements.

M. Dubois Reymond has pretty well established the existence in the nerves of a peculiar force in a static condition, having a certain resemblance to electro-magnetism, and probably accompanied by a definitive molecular arrangement of the nerve elements. This force he terms *electro-tonic.* Under the influence of a given stimulus the molecules pass from the static or electro-tonic condition of equilibrium into a state of electro-dynamism, and the movement is co-ordinate with a rearrangement of the molecules or of the molecular force. Thus, the molecular condition of the nerve in the static state is represented by a succession of peripolar molecules, the molecules being traversed by an equatorial or electro-positive zone, and by two polar or electro-negative zones; while the electro-dynamic state is represented by a change in the electric state of the molecules, in view of which the positive and negative—austral and foreal—poles of the adjacent molecules are brought in apposition as in magnetic polarity. Now, whenever this molecular change is effected in the most limited portion of a living nerve, the change cannot be arrested within, or conducted from the point implicated, but produces a similar molecular condition throughout the whole length of the nerve.* It is in this way that the dynamic nervous current or wave is supposed to be physiologically developed.

The natural inference from the theory of M. Dubois Reymond is, that anæsthetics act upon the molecules of the sentient nerves by holding in abeyance their electro-dynamic potentialities ; while the inference to be derived from their effects upon vibratile epithelia and the physico-vital movements of certain plants, leads us still farther to the conclusion

* See Béclard, Physiologie, p. 975. Paris, 1866.

that their presence in certain proportions among the molecules of an organism is absolutely incompatible with the manifestations of those properties by which alone we are able to distinguish life from death.

Hence we may readily understand how it is that "anæsthesia is nothing but a transient death of the sensitive nerve, since it consists in a temporary suppression of its properties"*—as we can also understand how anæsthetics, after having first overwhelmed the highly impressionable molecules of the sentient nerves, would, supposing it to be still possible to maintain life artificially, soon render this impossible, by continuing their devitalizing action upon the molecules of all the elements of the organism.

(To be continued.)

CONTINUOUS GUM MATERIAL.

BY D. D. SMITH, D.D.S.,

PROFESSOR OF MECHANICAL DENTISTRY AND METALLURGY IN PHILADELPHIA DENTAL COLLEGE.

WITH the view of overcoming some of the objectionable features in the construction of Continuous Gum Work, I have been engaged for some two years past in a series of experiments for the production of a continuous gum material, which, in their results, have been so satisfactory to myself that I deem them of sufficient importance to bring to the notice of the profession.

* Claude Bernard—see Revue des Cours Scientifique, No. 21, April 24, 1869. It is only just, however, that I should say, that while M. Bernard sustains the theory that anæsthetics act by elective affinity upon the sensitive cells of the nervous system, his idea of this action differs considerably from that which I have advanced. He says, immediately after the passage above quoted: "Chloroformized blood has lost its normal nutritive and stimulating properties for the sensitive nerves—as regards these nerves, it is therefore precisely the same as if they were entirely deprived of blood. I insist upon this point, inasmuch as we shall see that there are many other substances in the same category—that is to say, which vitiate or suppress the blood as regards a single tissue or element, while the sanguine fluid preserves its properties intact, *vis-à-vis* the other elements of the organism. Now, if chloroform, curare, strychnia, etc. only produce their effects upon the nervous system in virtue of their power to exert an 'elective affinity' of suppression upon certain properties of the blood, these agencies exert no positive or direct influence whatever upon the nerve elements, and the nervous phenomena consequent upon their action can be ascribed and ascribed only to 'an altered blood.' We know that chloroform affects powerfully the nervous system; this is a fact of demonstration; we have no demonstrable facts by which we can prove that chloroform, when inhaled in quantities sufficient to act upon the nervous system, changes the physiological properties of the blood. The assumption, therefore, that it does alter in a *specific* manner the properties of the blood, is simply an hypothesis, incomprehensible in itself, proposed for the purpose of making comprehensible what for the present we are forced to accept as an ultimate fact."

For entire upper or lower sets, it seems to be very generally conceded that the continuous gum dentures, for cleanliness and naturalness in appearance, have no superior, if, indeed, they have an equal. Other indispensable qualities in reliable artificial work, as strength, durability, and susceptibility of repair, have been, and still are, by many, thought to be markedly deficient in this style of work.

No impression, however, can be more erroneous than this, for in strength, when properly made, it is sufficient to withstand the severest tests of mastication: as for durability, it is impossible to wear it out; neither is it subject to breakages which cannot be repaired. While in repairing a broken case more time may be consumed than in staying a tooth on some other kinds of work, yet there is no artificial denture which can be repaired with greater certainty, or more neatly, than the Continuous Gum.

There are obstacles, however, to its successful construction, which many deem so great as to condemn it for practical use entirely. Among these are the warping of the plate in fusing the material, moving the teeth in the same process, continual shrinkage of the material with every heating, etc.

What I labored to obtain was a base which should possess the requisite strength, fuse at a comparatively low heat, adhere to the plate, and not be subject to the objections named above. From the recipes below a material can be produced which fuses compactly, attaches itself firmly to the plate, is as strong as any I have ever used of other kinds, will not to any appreciable extent displace the teeth in fusing, is not likely to warp the plate after the first heating (after which it may be forced into position on the die upon which it was formed), and in no instance, when it is properly manipulated, does it require more than three heatings to complete a set. Such is my experience in the use of it; and it is given to the profession in the hope that it may be found equally satisfactory by others.

My recipes, designated "Granulated Body" and "Flux," are as follows:

GRANULATED BODY.

Silex	20 parts.
Feldspar	24 "
Potassa caustica	1 part.

Titanium, $1\frac{1}{2}$ to 2 grs. to the oz. of the mixture.

The several ingredients are first ground very fine—each by itself—then thoroughly incorporated together, and subjected to a heat sufficient to fuse.

The fusing is best done on a slide in the large muffle of a toothmaker's furnace; but may be done in a good crucible, with cover luted on, in any coal-fire where the requisite heat can be obtained.

When fused, it should be reground, but not too fine. I have no rule about this save its working properties. If in packing it crumbles when the moisture is absorbed, it is too coarse, and should be ground until it will pack nicely.

FLUX.

Silex, ground very fine			18 dwts.
Feldspar,	"	"	10 "
Borax glass,	"	"	2 "
Cryolite ware,	"	"	1 dwt.
Potass. caust.,	"	"	10 grs.
Titanium,	"	"	1½ grs. to the oz. of the mixture.

This is to be fused in the same manner as the granulated body, and reground very fine—much finer than the granulated body.

For *Continuous Gum Body*, take of the flux and granulated body equal parts, by weight, and thoroughly mix.

The ingredients in both these mixtures should be the very best. An inferior variety of feldspar will greatly affect the quality of the material. That which has given the best results was some obtained from a small quarry in New Hampshire. Probably there is much of this mineral in use among tooth-makers equally as good as that referred to.

Borax glass is made by fusing crystalline borax in a crucible, adding piece after piece as it melts. It may be poured from the crucible while in a liquid state upon some clean mineral or metallic surface, as a piece of soap-stone; and, when cool, it is in a convenient form for reducing in the mortar.

The cryolite used is the uncolored pulverized *ware* of the Hot-cast Porcelain Company of Philadelphia.

For Gum Frit in the preparation of Gum Enamel I have relied upon our tooth-makers—they having facilities for making it which dentists ordinarily do not possess.

GUM ENAMEL.

Gum Frit, obtained at S. S. White's	4½ parts.
Flux (same as in the material without titanium)	16 "
Gran. body " " " "	11 "
Cryolite " "	7 "

These should be ground together, the mixture semi-vitrified, and reground about as fine as the granulated body, when it is ready for use. Different lots of this will vary somewhat in color, depending on the quality of the frit. Should the color be too deep, it may be modified by the addition of the gum enamel material, or the enamel containing no frit.

Although good results have been obtained when the material has been fused in small quantities in crucibles, yet none has been made in all respects as satisfactory as that fused in a large muffle.

If it could be made in considerable quantities by parties familiar with the process of combining and fusing minerals for similar purposes, no doubt better results would be obtained than when made under less favorable circumstances.

COMBINED ROOT, INCISING, SEPARATING, AND ELEVATING FORCEPS.

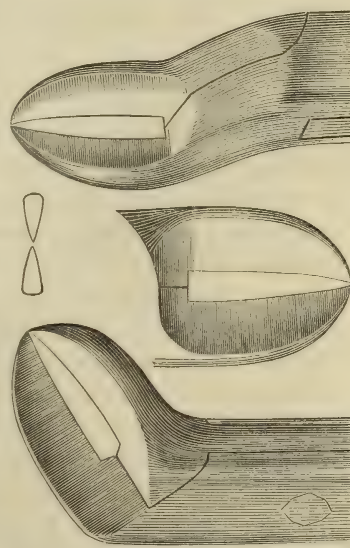
BY THOMAS C. STELLWAGEN, M.D., D.D.S.,

PROFESSOR OF DENTAL HISTOLOGY AND OPERATIVE DENTISTRY IN PHILADELPHIA DENTAL COLLEGE.

WHERE extraction is resorted to, which happily is becoming a more rare duty as our science advances, the complete removal of the entire roots of the teeth, with as little violence as possible, is conceded to be of the utmost importance; yet the proper performance of this task is oftentimes as difficult as it is imperative.

With a view of facilitating the manipulations, when the root is firmly and deeply imbedded in the bone, I had two instruments made some four years ago; subsequent trials having repeatedly proved their usefulness, it appears that a short description of them may be of service, to enable others to avail themselves of similar forceps, or perhaps to improve upon these, which are merely modifications and combinations of forms already familiar.

It is not intended that they shall be employed until it is evident that gentler means will fail, and even if of no further advantage, they, by assuring ultimate success, will often enable the operator to quiet his own misgivings, to which cause, as well as actual incompetency, many failures may be attributed.



Superior and inferior root, incising, and separating forceps, showing the curves of the cutting edges, the upper figure showing the first or bayonet-shaped forceps; the lower one, being bent almost at a right angle to the handles, is for the inferior teeth.

As is shown by the accompanying designs, there is one for each jaw, and the special peculiarity is in the formation of the beaks, each of which is brought to an edge upon the inner side, and these, from almost meeting at the points, as they run upward toward the joint, are gradually separated, leaving a half-oval space between them, when shut, almost as large, and of the tapering shape of the tooth roots, so as to save the latter from being crushed, and at the same time to prevent

slipping from their hold when a directly upward strain is brought to bear.

The whole instrument is made very stout and heavy, to guard against springing, which, in some instances, would render its use doubtful and even dangerous, especially where the processes of the jaw are thick, hard, and resistant.

The operation is performed in this wise: the soft tissues being first divided by a suitable knife or lancet, carefully apply the opened beaks on each side of the bone in a line over the middle or axis of the root; now somewhat rapidly but steadily close the handles, cutting through the alveolar walls, until the tooth substance is clearly felt between the blades; it then can be readily lifted out, or loosened so as to admit of immediate removal by an ordinary pair of forceps, without much if any pain.

It will be found that thus the danger of severe injury to the rest of the adjacent structures is almost entirely obviated; no longer need one dread the ugly and troublesome compound and comminuted fractures so often made by prying with elevators and heavy gum-lancets.

These patterns will also be found frequently to answer the purpose of either Physick's or the separating forceps.

LIABILITY OF VULCANIZERS TO EXPLODE.

BY JOHN D. MILES, VICKSBURG, MISS.

From the first introduction of the vulcanizer into the dental laboratory I have looked upon it as a dangerous apparatus. The frequent explosions which have occurred within its brief history attest the correctness of my convictions. Of the many instances coming to my notice, I have heard of no personal injuries caused till the case of the unfortunate Dr. Gish, recorded in the July number of your valuable journal. It was matter of regret to me that nothing was said as to the probable cause of that explosion. The truth is, the use of the vulcanizer has become really a matter of life and death; hence all facts that have any bearing on this subject should be collated and studied with a view to render the vulcanizer less dangerous in its use. I have yet to hear of a case of explosion in which the safety-valve gave any premonitions, or afforded the least security. Is it possible that, lost to all sense of honor, the manufacturer turns off his hands such imperfectly made articles that portions of their surface can sustain less pressure than the safety-plug itself? Is there no law, or means of compelling the thorough testing of vulcanizers as to their power of resistance?

For three years I have been using a Whitney vulcanizer without accident, though every time I look at the thermometer I feel very much

as if I were about to take a peep into the uncertain future! I would be glad to be put in the way of knowing how long, with care, I may continue so to use it with probable safety. Imperfect thermometers doubtless have much to do in causing explosions, as greater pressure often exists than is indicated by them. Is the power of resistance lessened by constant heating and pressure? To elicit light on this dark but engrossing subject is the object of this communication.

An explosion occurred several months since in a dental office adjoining my own, caused doubtless by the vulcanizers having been set on a coal fire in the chimney grate! The force of the explosion was terrific. My office windows rattled and the walls trembled, as if under the shock of an earthquake. On rushing to the scene of disaster, I found the room filled with smoke, the grate demolished, fire, ashes, and soot scattered over the room, and the doctor turned into an impromptu Ethiope! The fragments flew closer to the doctor's head than was comfortable for after-reflection, and in their flight considerably damaged the room and furniture.

PROCEEDINGS OF DENTAL SOCIETIES.

THE AMERICAN DENTAL ASSOCIATION.

BY W. C. HORNE, D.D.S., NEW YORK.

The ninth annual meeting of the American Dental Association was held at Saratoga Springs, New York, commencing on Tuesday, August 3, 1869. There was an attendance of one hundred and thirty-six members.

The Association was called to order at 11 o'clock by the President, Dr. Jonathan Taft, and the session opened with prayer by the Rev. John Woodbridge, D.D.

Dr. J. G. Ambler, of New York, Chairman of the Committee of Arrangements, delivered the usual address of welcome; which was followed by the roll-call.

The reading of the minutes was commenced, but dispensed with before it had proceeded far.

The Report of the Committee on Dental Pathology and Surgery was presented and read by Dr. Atkinson.

The hours of business were then appointed, and an adjournment taken to 3 o'clock. The whole of the afternoon session was occupied with discussions upon Dental Pathology and Surgery.

SECOND DAY.

The Treasurer presented his report, which was referred to an auditing committee; and the discussion on Dental Pathology and Surgery was resumed.

The Committee on Dental Chemistry failing to report, Dr. T. L. Buckingham made, by request, a verbal report.

The rules were now suspended to allow Professor Truman to offer two resolutions: one directing the Treasurer to refund certain dues claimed to have been illegally demanded; and the other recommending dental societies to admit female practitioners to membership. The resolutions were temporarily laid on the table.

The discussion upon Dental Chemistry ensued; after which the time of final adjournment was fixed at 5 o'clock of Friday.

At the opening of the afternoon session Dr. C. R. Butler presented the report of the Committee on Operative Dentistry. The rules were then suspended, and the following Nominating Committee was appointed, and instructed, for the present, to nominate the standing committees only:

W. W. Allport, C. E. Francis, M. S. Dean, T. L. Buckingham, Homer Judd, L. D. Shepard, A. H. Brockway, A. L. Northrop, C. W. Robinson.

The regular order being resumed, Dr. C. Palmer made an additional report on Operative Dentistry, illustrated by large diagrams and models of the superior and inferior dental arches; and Dr. Perkins presented a patient who had lost the entire inferior maxilla from phosphor-necrosis.

The Auditing Committee, consisting of Drs. M. S. Dean, E. A. Bogue, and L. D. Shepard, to whom the Treasurer's account was referred, reported it to be correct. They expressed the opinion that permanent members consist of all those who have once attended as delegates, and that such persons remain permanent members until, their dues being paid in full, they voluntarily withdraw, or are dishonorably dropped from the rolls for non-payment of dues. They also recommended the adoption of the following resolution:

Resolved, That a dentist having once appeared as a delegate, and become a permanent member, is not eligible to act again as a delegate until his dues are paid in full.

After a sharp debate this resolution, on a call of the yeas and nays, was adopted by a vote of 29 to 28; the President voting in the affirmative.

By permission, Dr. Horne changed his vote to the affirmative; after which he moved a reconsideration, which was rejected.

THIRD DAY.

Dr. H. Judd presented the report of the Publication Committee, which showed a balance of $152.78 to be due them. The Committee published five hundred copies of the Transactions for 1868, at a cost

of $475. The report was accepted, and the Committee discharged, with the thanks of the Association, and the balance due ordered paid.

The Nominating Committee reported the names of Standing Committees for the ensuing year. The report was recommitted, with instructions to make certain changes, and to nominate officers.

Dr. Atkinson offered a resolution to refer to the Committee on Dental Literature a new work of Dr. J. E. Garretson, entitled "Diseases and Surgery of the Mouth," which he commended very highly, as the last and most accurate statement of the condition of medical knowledge in this department. The Committee declined to consider the subject, from lack of time, and the resolution was laid on the table.

The Committee on Prize Essays made the usual report, that nothing had been presented for their consideration.

Discussion upon Operative Dentistry was then commenced, and occupied the rest of the morning session.

At the commencement of the afternoon session, after much balloting, the City of Nashville was selected as the next place of meeting.

Dr. Morgan said he wanted every member of the Association to feel that he was bound to be present at the next meeting in Nashville. He related of Professor Agassiz, that on being requested to visit various cities to lecture, he replied that he had not time to be running about making money, he had more important business to attend to. He (Dr. M.) desired members to feel that it was of more importance to them to attend the annual meeting than to stay at home to make money.

Dr. Atkinson said he had been requested by Dr. Evans, of Paris, to say that he had expected to be present at this meeting (having been mistaken as to the date of its session), but that he had to return to Paris to be present on the fête day of his pet emperor. He had been greatly pleased with what he saw of Dr. Evans during his short stay; he was one of the few men who could be petted without being spoiled; he had received, without solicitation, many orders of knighthood; and he (Dr. A.) indorsed him as a Christian and a scholar. Though dwelling so long in a foreign land, he had maintained his loyalty to American principles and American dentistry, and he desired to be so recognized by his fellows in this Association.

The Committee on Nominations then made the following report:

FOR OFFICERS.

President.—Homer Judd, St. Louis; W. W. Allport, Chicago.

First Vice-President.—S. J. Cobb, Nashville; J. F. Knapp, New Orleans.

Second Vice-President.—C. E. Francis, New York; W. H. Shadoan, Louisville.

Corresponding Secretary.—I. A. Salmon, Boston; H. J. Smith, Illinois.

Recording Secretary.—W. C. Horne, New York; M. S. Dean, Chicago.

Treasurer.—W. H. Goddard, Louisville.

STANDING COMMITTEES.

Committee of Arrangements.—W. H. Morgan, S. J. Cobb, W. H. Shadoan.

Committee on Publication.—M. S. Dean, E. A. Bogue, J. Taft.

Committee on Prize Essays.—G. T. Moffatt, J. F. Adams, H. G. Mirick, S. M. Cummings.

Committee on Dental Physiology.—J. H. McQuillen, James Truman, H. F. Bishop.

Committee on Dental Chemistry.—T. L. Buckingham, John Allen, G. R. Thomas.

Committee on Dental Pathology and Surgery.—W. H. Atkinson, J. S. Knapp, C. R. Butler.

Committee on Operative Dentistry.—J. Taft, George H. Cushing, Corydon Palmer.

Committee on Mechanical Dentistry.—W. H. Eames, S. B. Palmer, Z. Cotton, L. M. Sturgis.

Committee on Dental Education.—M. S. Dean, J. N. Crouse, S. J. Cobb.

Committee on Dental Literature.—L. D. Shepard, J. McManus, H. J. Smith.

Committee on Voluntary Essays.—I. J. Wetherbee, C. D. Cook, L. S. Straw.

Committee on Dental Histology.—Homer Judd, W. W. Allport, R. W. Varney.

Committee on Dental Therapeutics.—T. B. Hitchcock, C. N. Pierce, G. F. Waters.

Committee on Dental Instruments and Appliances.—Frank Abbott, A. M. Holmes, J. B. Morrison.

The Standing Committees were confirmed. An evening meeting was then ordered to receive the report of the Committee on Amendments to the Constitution.

At 8 o'clock the evening session was opened, and the above-named report read and accepted. After various motions to adopt, to recommit, etc., the whole subject was laid on the table.

An election of officers was then held.

Drs. Judd, Morgan, and Allport were voted for, and, after several ballots, Dr. Homer Judd was elected President; Dr. S. J. Cobb and Dr. C. E. Francis, Vice-Presidents; Dr. I. A. Salmon, Corresponding

Secretary; Dr. M. S. Dean, Recording Secretary; Dr. W. H. Goddard, Treasurer.

The Association then adjourned to the next morning.

FOURTH DAY.

A committee of five was ordered to make arrangements for reduction of railway fares to Nashville next year, namely, T. L. Buckingham, I. J. Wetherbee, E. A. Bogue, G. H. Cushing, G. R. Thomas.

Dr. McQuillen, Chairman of the Committee on Histology, made a verbal report, accompanied by a number of microscopical specimens recently prepared by him. 1, of injected pulps of calves' teeth; 2, of the kidney of the sheep; 3, of the muscles of three persons who had died within the past year of trichiniasis, along with a portion of the pork, containing trichinæ, which had caused the disease in one of the deceased; after which the subject was discussed.

The report from the Committee on Mechanical Dentistry was presented by Dr. John Allen, who regretted that, while the operative branch of dentistry had advanced so much within a few years, in this department the general course of dentists had been to make the cheapest instead of the best work. The difficulty of obviating the discrepancy between the mouth and the dies made from the impression was admitted, but the idea of remedying this by resorting to a plate of lighter material was controverted as false in principle, which was exemplified by the simple experiment of a sheet of paper supported upon the mouth of an inverted tumbler full of water. There is demand, then, for a process which shall insure mathematical accuracy in the fitting of the plate; as well as great need of skill in the arrangement of teeth to conform with the characteristics of the face.

He was followed by Dr. S. B. Palmer, of Syracuse, with an essay on "Repairing Vulcanite," and by Dr. J. A. McClelland with an essay on the "Collodion Base."

The essay of Dr. Palmer is explanatory of a method of thoroughly repairing broken rubber-plates by varnishing the surfaces, to which the new rubber is to be attached, with a creamy solution of rubber in chloroform; to be kept on hand for such use. He states that repairs made in this way are perfectly reliable, even if the broken edges are only beveled, without dovetailing or perforating the old piece. Wax, gutta-percha, oil, or soap are agents which prevent rubber from being vulcanized, and they should, therefore, be carefully kept from contact with any piece to which it is intended to apply this process.

The essay on "Consolidated Collodion, Pyroxylin, or Rose Pearl," is an enthusiastic description of the method of preparing that material for use in dental plates. It is prophetically characterized as "the coming base." The time required for the evaporation of the ether

seems to be an inconvenience, "because we have become so demoralized in our ideas of time by the use of a cheap substance (rubber) that requires but a few hours and little skill to make into plates." "In practice the time required for 'Rose Pearl' to fit *herself* for the mouth is soon regarded as gain rather than loss." The shrinkage of the material is said to be controlled by such simple means that the cry, "It shrinks!" becomes one of ridiculous insignificance to the friends of "Rose Pearl."

Dr. Corydon Palmer exhibited an improved moulding flask, and explained its advantages in difficult cases. A vote of thanks to Dr. Palmer was passed (which the Secretary was instructed to have handsomely engrossed) for the manner in which he had presented, by means of plaster models and diagrams, an advanced method of preparing and filling teeth, and an appropriate classification of fissures where teeth are most liable to decay.

The report of the Committee on Voluntary Essays was presented and adopted.

Dr. M. S. Dean, from the Committee on Dental Education, presented a report on the importance of a thorough preliminary education for dental students, and was followed by Dr. S. B. Palmer, with an essay on "Dental Education for the People."

Dr. Palmer advocated the diffusion of knowledge in regard to the preservation of the dental organs by means of tracts or periodicals. He believed there was great necessity for such information, and that it would be highly appreciated.

Dr. Cobb indorsed the sentiments of the essayist; he was greatly impressed with the ignorance of educated people in regard to their teeth; all that the community know in regard to such matters is the little information they pick up in the dentists' offices. He held it to be the duty of practitioners to instruct their patients. Many more people would have their teeth preserved if they knew that it was true economy to do so. He strongly commended the plan of the *People's Dental Journal*, and was much in favor of the distribution of tracts to increase popular dental knowledge. There would be vastly more dental work done if people knew the importance of it; something in the form of a catechism, or instruction which might be introduced into schools, was a *desideratum*. No branch of knowledge was more neglected, and none would insure more immediate good results by its propagation. It was a common idea that the charges of dentists were exorbitant, whereas they were far more moderate in proportion than those of physicians and general surgeons.

Dr. McDonald advocated the preparation of tracts, under the auspices of the Association, for distribution among the people. Early instruction in regard to the value of the teeth, and proper means of caring for them,

would be of immense value to the American people and to American dentists. A great many more teeth would be filled, but there would eventually be a great many less large operations to be performed, and, consequently, a great deal better condition of the teeth might be insured at much less expenditure of money.

The Committee on Dental Literature had no report.

The Committee on Dental Therapeutics made a very brief report by Dr. Bogue.

The report of the Committee on Dental Instruments and Appliances was presented by Drs. F. Abbott and C. Palmer. They noticed improvements in dental chairs by J. B. Morrison and O. C. White; a plating for instruments of pure nickel, by M. M. Johnson; an instrument for rolling gold foil, by J. B. Adams, of Worcester; an instrument for regulating heat in the manufacture of nitrous oxide, where ordinary burning gas is used, by J. P. Coolidge, of Boston; clamps and buttons to close the duct of Steno, by B. T. Whitney; a pneumatic mallet by W. H. Jackson, of Ann Arbor; an improved regulator and heater where kerosene is used in making nitrous oxide, by A. W. Sprague; burs by S. S. White, of fine steel, regularly divided and evenly cut, which, instead of being left with the file finish as in ordinary burs, are, after hardening, finished with a stone to an edge as fine as a lance-blade, so that in the hands of a sufficiently skillful operator they will cut with the least possible pressure, avoiding almost entirely the unpleasant sensation of ordinary burs; artificial teeth, by S. S. White, which the Committee stated were the finest they had seen, in their expression, and proportion between the upper and lower sets; nitrous oxide, ether, and chloroform inhalers, by Dr. Wilson, securing greater safety in the use of these inhalers by insuring perfect control of the supply of atmospheric air, in well-defined proportions.

The report of the Executive Committee was then presented and adopted.

The report of the Committee on Amendments to the Constitution was taken from the table, and the report was adopted without even a reading of it.

Dr. Truman's resolution on the right of female dentists to membership was indefinitely postponed, because the Association had no right to make recommendations to local societies.

Dr. Buckingham gave notice of an amendment to the Constitution, to be acted upon next year, providing that no person who holds a dental patent, or is pecuniarily interested therein, shall be a member of the Association.

Dr. W. H. Shadoan offered a resolution donating the amount of back dues, from 1865 to 1869, to thirty-three members, who were reported by him to be in arrears, each to the amount of $23. The resolution passed after an animated debate.

The Committee on Ethics reported, through Dr. Shepard, that they had had brought before them charges against Dr. J. A. McClelland, of Louisville, for violating Article II., Section 3, of the Code of Ethics, by placarding large advertisements on the street cars of Louisville, and by unprofessional advertisements in the papers, which were read; they therefore offered the following resolution: "That J. A. McClelland, of Louisville, be expelled from this Association."

They also reported that they found upon the records of the Association charges against Dr. C. P. Fitch, of New York, for violation of the same clause of the Code of Ethics; but they did not feel authorized to recommend action on his case, as no definite charges or proofs had been offered.

Dr. Atkinson called to mind the remark of Dr. McQuillen at the time of the adoption of the Code of Ethics, that it was unnecessary for gentlemen, and useless for those who were not such. He did not like the idea of singling out one or two as examples and leaving all the others to go free. It was well known that Dr. Watt, who had so persistently urged the adoption of this code, had gone home and signally violated its provisions, and yet no one had lifted up a voice against him. He thought the adoption of laws of this nature peculiarly unfortunate; because they would be brought to bear unequally; while one would be made to suffer the utmost penalty, others would be allowed to go free.

Dr. Fitch asked to be heard in explanation. He said that many loose and unfounded charges were floating about against him. The sum of his offense, he said, was this: that he had advertised the public of New York in good faith that he was ready to operate at reduced prices on certain days and hours; because there was a large class of most worthy people in that city who were desirous to preserve their teeth, and could not afford to pay the current rates of first-class operators. He had done nothing to lower the standard of professional skill, but only made use of the circumstances of the case to minister to his necessities. He yielded to no man in his love for the profession, and his desire for its advancement. He had meant to do no wrong in any course he had pursued, and, whatever the action of the Association, should endeavor to maintain the character of his professional operations, and devote his efforts to the relief of humanity within the range of his practice.

On a motion being made to refer Dr. McClelland's case to the Committee on Ethics for the ensuing year—

Dr. McQuillen opposed very strongly the postponement, and was in favor of proceeding at once with the trial of this case, which was a most flagrant one. As already stated, he had objected to the adoption of a code of ethics; but since it had become part of the organic law of the Association, he demanded its enforcement. While it was mortifying to know that the Code had been violated by one who had prepared it,

and was most zealous in forcing it upon the organization, yet it was not an unusual thing in the history of morals for men to make laws and then to be the first to break them. It was much better to make few if any professions, and rather exceed than fall short of such as are made. We could, however, only deal with cases in which specific and thoroughly substantiated charges had been brought before the Association: two such were under consideration. One of these, Dr. Fitch, had abandoned the objectionable practice, and offered an explanation with the desire of making some reparation; but in the other instance the accused was openly, and in the most objectionable manner possible, pursuing his unprofessional course. The rules of the Association had been so often suspended that there could be no possible objection to doing so then, and proceeding with the trial. The person charged with the offense was present, and no injustice would be done to him, as the members would listen patiently to what he might say in defense of his course before taking action upon it. If there was one class of men in particular for whom he entertained the most profound feeling of pity (he would not say contempt, for one should endeavor to unlearn that) it was those who were so lost to all sense of propriety and decency that they could stoop to the low tricks of charlatans, and thus engage in practices which cast a stigma upon themselves and the profession they dishonor. If such as these were to be present as meet companions, it would soon make not only the Association but the profession a by-word and a reproach. What they could want in the organization was difficult to conceive, for they were not with it in spirit, and should not be of it in person. Laws promptly and justly enforced in such a case would exercise a beneficial influence upon the *morale* of the profession.

Dr. Horne stated that the clause under which Dr. McClelland was indicted required that the charges should be investigated and reported upon at the next annual meeting after that at which they were made. The Association had adopted the report of a committee which proposed to substitute a new Constitution without a word of debate. If the old Constitution were in force, Dr. McClelland had the right to a copy of all the charges and specifications, and a year to answer in; if the new one were in force, there was no provision by which he could be brought to trial.

The portion of the report in regard to Dr. Fitch was then adopted; that relating to Dr. McClelland was referred to the Committee on Ethics for the ensuing year. Drs. W. H. Morgan, C. R. Butler, and L. D. Shepard were appointed as that committee.

A resolution of Dr. Bogue's, expressing regrets at the existence of misapprehensions as to certain members (unnamed), and for the injustice of an *ex post facto* interpretation of laws, was laid on the table; and another, by the same, calling for a vote of censure on Dr. Atkinson,

for disregarding the rules of order, was replied to by Dr. Atkinson in a characteristic manner. The resolution was ordered to be expunged.

The Publication Committee was instructed to print the Constitution with the Transactions.

Dr. Homer Judd was then inducted as President, and Dr. Taft read an address, after which the Association adjourned to the first Tuesday of August, 1870.

DR. TAFT'S ADDRESS.

Dr. Taft said that his inclinations would lead him to retire in silence, but that custom seemed to require an address on the occasion of retiring from so honorable a position. He tendered his congratulations on the present condition of the profession, which was in advance of anything before attained, while the future promised continued progress. The labor and efficiency which had insured this advancement had also won for the profession public interest and esteem. The responsibility of enlarged privileges and advantages is measured by ability, whether inherent or attained by slow growth and effort. We are too apt to forget that each one has a work that no other can do. Each has his individual responsibility to himself, to society, to his profession, and to God. He who is faithless to himself will not be faithful to others, for no man loves others better than himself, as a rule. Every man should endeavor to fill the ideal of the Author of his being, cultivating his talents to the highest degree. There are various incentives to this. In every man there is a tribunal that holds him to a strict account. His own comfort and welfare require that he should neither be barren nor unfruitful. His duty to others demands such self-cultivation. We are so inseparably linked together by many and strong ties which we cannot break, that if we fail to be attuned according to the infinite design, discord is the result. No man can with justice to himself afford to base his professional character and reputation upon aught but an immutable foundation. Let it be fixed upon the rock of truth, and not upon the sands of error. We all require for our growth and nourishment the best food we can get. Why then rest satisfied with the husks, and too often with offal? Let us seek and eat the pure bread of life, that we may grow to the stature of perfect men. We are under great obligations and responsibilities to our fellow-men, to society; and it is impossible to dispose of those obligations otherwise than by a faithful fulfillment of them. The duties that devolve upon us to the profession that we have espoused—taken for better or worse—are, that we should carefully look to its interests, and labor industriously for their promotion. He has no sympathy or patience with the professional brother who, reposing in his quiet selfishness, or reclining upon his dignity, refuses to take part in the great labor of

the day. The man who does not feel and yield to the great impulses of the age, who is not fired with their spirit, belongs to by-gone days; by some mishap his coming has been delayed a few generations. Let us lay aside all antagonisms except against error and ignorance; we have not time nor strength for fruitless contests, for precedence and self-aggrandizement; we should make harmonious efforts to promote the good and advance the cause of our profession. It would be pleasant to take a retrospect of the past; but it is not expedient for him who runs a race to look back before the goal is won.

His earnest desire was, and should be, that our profession, which this Association so fully represents, may take its position as one of the battalions in the great army of progress, and keep abreast with the foremost in the march, who tramp, tramp, tramp to the music of the age in the glorious consummation of the redemption of humanity from the dominion of disease and death.

(To be continued.)

SOUTHERN STATES DENTAL ASSOCIATION.

At the urgent solicitation of several leading members of the dental profession, Dr. W. H. Morgan, of Nashville, Tenn., issued a call for a Convention at Atlanta, Ga., on the 28th of July, 1869.

In response to this call over fifty dentists assembled at the City Hall on the morning of that day.

Professor J. S. Knapp was called to the chair, supported by Dr. W. H. Morgan as Vice-President. Prof. F. J. S. Gorgas, of Baltimore, and Prof. J. G. Angell, of New Orleans, Secretaries.

The Chairman, after stating the objects of the meeting, appointed Drs. Morgan, Gorgas, W. T. Arrington, Chandler, and Jones a committee to draft a constitution, by-laws, and code of ethics.

During the absence of the committee a general expression of views was given relative to the objects of the meeting.

The committee reported at 11 A.M. The constitution, including by-laws and code of ethics, after being read, was, with a few alterations, approved and adopted article by article, and as a whole.

MEMBERS.

Georgia.—H. Marshall, A. C. Ford, J. D. Thomas, Albert Hape, E. B. Marshall, C. D'Alvigny, Atlanta; H. A. Lowrance, Athens; R. A. McDonald, Griffin; J. P H. Brown, S. G. Holland, Augusta; T. J. Jones, Sparta; H. T. Henry, Covington; J. A. Tigner, Fort Valley; E. W. L'Engle, F. Y. Clark, Savannah; T. W. Hentz, J. Fogle, Columbus; W. H. Burr, Madison; T. J. Crowe, Macon; E. M. Allen, Marietta; B. B. Alford, La Grange; W. T. Cole, Newnan.

Alabama.—S. Rambeau, Montgomery; H. A. McDaniel, C. A. Jordan, Huntsville; H. B. Boyd, Troy; J. G. McAuley, Selma.

Tennessee.—W. H. Cook, Cleveland; John Fouché, Knoxville; W. T. Arrington, Memphis; W. H. Morgan, Nashville.

Kentucky.—W. G. Redman, Louisville.

Arkansas.—L. Augspath, Helena.

South Carolina.—W. Reynolds, Columbia; J. M. Day, Aiken.

Louisiana.—J. S. Knapp, J. R. Walker; J. G. Angell, G. J. Friedericks, W. S. Chandler, New Orleans.

Maryland.—F. J. S. Gorgas, Baltimore.

At the evening session the following officers were elected:

President, Dr. W. T. Arrington, of Memphis; 1st Vice-President, Dr. Reynolds, of South Carolina; 2d Vice-President, Dr. Augspath, of Arkansas; 3d Vice-President, Dr McAuley, of Alabama; Corresponding Secretary, Prof. Gorgas, of Maryland; Recording Secretary, Prof. Angell, of Louisiana; Treasurer, Dr. Redman, of Kentucky; Executive Committee, Drs. Morgan, of Tennessee, Knapp, Walker, and Chandler, of Louisiana, and Hape, of Georgia.

The retiring Chairman of the Convention and the President-elect of the Association, each in turn, made interesting speeches to the Association on dental education, and the benefit to be derived from such societies.

The following committees were then appointed by the President:

COMMITTEES.

On Membership.—Drs. J. S. Knapp, La.; T. J. Jones, Ga.; G. J. Friederick, La.

On Publication.—Drs. W. S. Chandler, La.; J. R. Walker, La.; J. G. Angell, La.

Dental Education.—Drs. F. J. S. Gorgas, Md.; J. P. H. Brown, Ga.; W. M. Reynolds, S. C.

Physiology and Surgery.—Drs. F. Y. Clark, Ga.; S. Rambeau, Ala.; J. Fouché, Tenn.

Dental Chemistry.—Drs. J. G. McAuley, Ala.; W .H. Burr, Ga.; E. M. Allen, Ga.

Dental Therapeutics.—Drs. F. Y. Clark, Ga.; G. J. Friedericks, La.; H. Marshall, Ga.

Operative Dentistry.—Drs. W. H. Morgan, Tenn.; J. Fouché, Tenn.; H. A. Lowrance, Ga.

Mechanical Dentistry.—Drs. W. G. Redman, Ky.; E. W. L'Engle, Ga.; S. G. Holland, Ga.

Dental Literature.—Drs. J. P. H. Brown, Ga.; H. A. McDaniel, Ala.; T. J. Jones, Ga.

Voluntary Essays.—Drs. J. R. Walker, La.; J. M. Day, S. C.; W. S. Chandler, La.

Histology and Microscopy.—Drs. W. T. Arrington, Tenn.; T. J. Jones, Ga.; John G. Angell, La.

Various interesting letters were read from distinguished members of the dental profession, breathing a genial and progressive spirit, and expressing most ardent sympathy with the movement, which were placed on file.

Prof. J. S. Knapp read an exceedingly able paper, written by Prof. A. F. McLain, of New Orleans, on "Prophylaxis, or Prevention of Dental Decay," which gave rise to an animated discussion on the same subject.

Dr. J. P. H. Brown read an interesting essay on the "Progress of Dental Science," which, with the paper of Dr. McLain, was referred to the Publication Committee.

Prof. Gorgas, of Baltimore, read a paper by Prof. S. P. Cutler, of Holly Springs, Miss., entitled "Microscopy of the Teeth," for which the thanks of the Association were awarded.

Dr. F. Y. Clark, of Savannah, exhibited a set of artificial teeth which were worn by General Oglethorpe, and which were curious in respect to their antique style of workmanship.

By invitation, after adjournment of the morning session, the members of the Association visited the medical college.

At the hour of three the Association partook of a sumptuous dinner, provided for them by the Council and citizens of Atlanta, at the National Hotel, at which general good feeling prevailed, and many speeches and toasts were given.

At the evening session of the second day the time was spent almost exclusively in discussions on the treatment of teeth already devitalized, those which have given rise to alveolar abscess, and those which have not.

A portion of the members left for their homes on the evening of the second day; but the session of the third and last day was attended by over thirty members, who resumed the discussion of the previous day with much spirit and interest, and extended it so as to embrace especially the subject of preservation of the vitality of exposed pulps.

It is seldom in any dental assembly that a subject of this kind is so generally participated in, or so much interest elicited. This may be accounted for by the fact that its importance is now more generally understood, as well as by the fact that the very able President, Dr. W. T. Arrington, would immediately bring any member to order who wandered from the subject.

A vote of thanks was offered to Mr. Samuel Hape, of the Dental Depot in Atlanta, for providing arrangements for the Association, and for courtesies extended.

A vote of thanks to the City Council of Atlanta, and also to the

railroad companies, and to the press of Atlanta, for their aid and kind courtesies, was given.

Amid much enthusiasm and high hopes for the future good to be accomplished by the Association, they adjourned to meet in New Orleans on the 2d Wednesday in April, 1870.

After the adjournment, committees were formed for the purpose of organizing State dental societies in the States of Alabama and Georgia. —*Daily Constitution, Atlanta, Georgia, August* 2, 1869.

SIXTH DISTRICT DENTAL SOCIETY OF NEW YORK.

The first regular annual meeting of the Sixth District Dental Society, comprising the counties of Broome, Tioga, Tompkins, Chemung, Schuyler, Cortland, Madison, Otsego, and Delaware, was held at the Lewis House, in the City of Binghamton, on Tuesday and Wednesday, June 22d and 23d, 1869.

The meeting was called to order at 2½ P.M. by the President, Dr. S. H. McCall, of Binghamton, who, in the absence of the Secretary, appointed Dr. Frank B. Darby, of Owego, Secretary *pro tem.*

On calling the roll the following members answered to their names: Drs. S. H. McCall, Binghamton; R. Walker, Owego; A. M. Holmes, Morrisville; L. A. Rhodes, Norwich; F. B. Darby, Owego; and H. Hodge, A. D. Turner, and A. A. Ballou, of Binghamton. Upon payment of a membership fee of two dollars, the following gentlemen were duly elected as members of the Society: Drs E. P. Byram, Cooperstown; P. F. Brownell, Elmira; L. E. Ireland, Unadilla; E. D. Freeman and E. S. Walker, Greene; F. M. Snook and J. S. Smith, Waverley; and J. C. Robie, L. M. Van Buskirk, M. A. Newman, and C. A. Perkins, of Binghamton.

The minutes of the last meeting were read and approved; the Treasurer's report presented and adopted, after which the President delivered his inaugural address.

F. T. Maybury, M.D., of Binghamton, being present, was elected an honorary member.

Dr. B. T. Whitney, of Buffalo, Treasurer of the State Dental Society, was present by invitation, and contributed largely to the success of the meeting by his interesting remarks, from time to time, during the session.

The election of officers for the ensuing year resulted as follows:

President.—Dr. S. H. McCall (re-elected), Binghamton.

Vice-President.—Dr. P. F. Brownell, Elmira.

Recording Secretary.—Dr. Frank B. Darby, Owego.

Corresponding Secretary.—Dr. A. M. Holmes, Morrisville.

Treasurer.—Dr. H. Hodge, Binghamton.

Censors.—Elected for one, two, and three years: Dr. A. M. Holmes, one year; Dr. H. Hodge, two years; Dr. Frank B. Darby, three years.

The following gentlemen were elected delegates to the meeting of the American Dental Association, held at Saratoga Springs, on the first Tuesday in August: Drs. McCall, Walker, Rhodes, and Holmes.

Dr. Walker being called upon, read an essay on "Mechanical Dentistry."

Dr. McCall read a paper on "Sensitive Dentine."

The above subjects were freely discussed, after which the subject of "Treating Exposed Nerves" was taken up.

Drs. Smith and Van Buskirk reported cases of filling teeth after removal, and replacing the same successfully.

The Committee appointed to draft by-laws made a report, which was unanimously accepted.

The Committee on Programme for the semi-annual and annual meetings report the following gentlemen to prepare essays on the several subjects mentioned:

Semi-Annual.—Dr. E. D. Freeman, "Periostitis;" Dr. Van Buskirk, "Treating and Filling Exposed Nerves;" Dr. H. Hodge, "Dental Art."

Annual Meeting.—Dr. E. P. Byram, "Disease of the Antrum;" Dr. F. M. Snook, "Salivary Calculi;" Dr. A. M. Holmes, "Benefits of Dental Societies;" Dr. Frank B. Darby, "Diseases of the Gums."

The following resolutions were unanimously adopted:

Resolved, That we incorporate in our by-laws that no member be allowed more than five minutes to speak on any subject, unless permitted by the President.

Resolved, That the Society tender their thanks to Dr. Whitney for his presence, and many valuable hints given.

Resolved, That the President invite Dr. Maybury to prepare an essay for the next annual meeting. Subject: "The Relation of the Medical Profession to the Dental."

After the transaction of the ordinary business, and listening to Dr. Smith on the subject of porcelain plate-work, the Association adjourned to meet at Elmira in September, subject to the call of the President.

FRANK B. DARBY, *Recording Secretary.*

HARRIS DENTAL ASSOCIATION OF LANCASTER, PA.

THIS Association convened statedly on Thursday, August 5th, at 10 A.M., at Ephrata Mountain Springs, with a full attendance of officers and members.

Dr. Hoffer read an essay upon "Mechanical Dentistry," and exhibited impressions, models, flasks, etc. in illustration of his subject.

A very interesting and lengthy discussion followed, in which the merits and advantages of the various methods used in mounting artificial teeth were thoroughly canvassed and compared. The subject of mercury in rubber was also discussed.

Dr. McCalla presented, and, at the request of the Association, read the "Code of Ethics of the Pennsylvania Association of Dental Surgeons," adopted in 1854.

A couple of newspaper cards from gentlemen in a neighboring city, prominent in the profession, were read and commented upon by the Secretary, which elicited a very animated discussion upon the subject of *quack advertisements.*

To a modest card or circular as a means of bringing our professional services to the notice of the public, no objection was urged; but claims to do the *best, finest,* and *cheapest* work in one's special locality, or offers of superior tooth-powders and mouth-washes, the *ingredients of which are known only to the advertiser, his chemist and druggist,* and all other bombastic and high-sounding representations, were denounced in the severest terms, as undignified and unprofessional.

The following resolution, offered by the Secretary, was unanimously adopted, after which the Association adjourned to meet in Columbia, on Thursday, the 4th of November next:

Resolved, That, in view of the laudable efforts now being made to elevate the standard of dentistry as a profession, we deprecate the exhibition of specimens of dental mechanism at agricultural and mechanical fairs, or other similar places, as derogatory to the profession, and calculated to bring down a noble calling to the level of an ordinary handicraft. WM. NICHOLS AMER, *Secretary.*

MISSOURI VALLEY DENTAL SOCIETY.

THE second annual meeting of the Missouri Valley Dental Society was held in the office of Dr. E. J. Woodbury, Council Bluffs, Iowa, July 13th and 14th, 1869.

E. J. Woodbury was elected President; C. Thomas, of Nebraska City, Nebraska, Vice-President; and J. F. Sanborn, of Tabor, Iowa, Secretary and Treasurer.

Dr. E. S. Williams, the retiring President, delivered the annual address on "The Duties of the Profession."

The Society meets semi-annually on the second Tuesday and Wednesday in January and July. J. F. SANBORN, *Secretary.*

EDITORIAL.

AMERICAN DENTAL ASSOCIATION.

At the appointed hour on Tuesday, August 3, 1869, the American Dental Association convened at Saratoga, and continued in session for four days, during which considerable work was accomplished. The attendance was quite as large as could have been expected (one hundred and thirty members, in addition to a number of dental practitioners not connected with local societies, being present) at a fashionable watering-place, whose chief attraction is the medicinal qualities of its springs. Delegates from the local organizations of every section of the country were present; and, as the representative men of the profession, whose respective fields of labor are far removed from each other, they came together, animated by one common object,—the free and open communion of thought and experience, on all subjects relating to the principles and practice of dentistry, and other interests of the profession. It may be said, and perhaps with justice, that some of the ground passed over was, to a certain extent, a repetition of former discussions, on the part of the members of the Association. This, however, in the consideration of practical matters is almost unavoidable, particularly when embracing the citation of personal experience in the use of some particular article or mode of treatment. From such an interchange, even though there be repetition year after year of the same ideas and experiences, something of value must be evolved. The smallest acquisition of truth or of energy under such circumstances is so much added to the wealth and usefulness of the profession. In all associations much of the apparent activity consists in intellectual gyrations round some common centre, for the minds of the majority of men seem never better pleased than when traveling over well-beaten tracks. It is pleasant to ride in a street-car moving over a smooth and well-laid track, and the contrast is disagreeable, and the situation sometimes dangerous, when the car runs off the track and is drawn by the horses over the rough cobblestones. Thus is it with new subjects and new ideas. The minds of the many prefer to run in old and well-polished grooves, demanding little or no mental exertion, rather than be subjected to the annoyance of entering upon the study of new and untried fields demanding mental exertion and labor, particularly if it conflicts with old and cherished ideas. It was clearly demonstrated, however, during the discussions of the American Dental Association, and in private conversations taking place during the intervals of the sessions, that the representative members of our profession are not thus constituted, but, on the contrary, are eager and anxious for light on that all-important and absorbing subject, the phenomena of life.

The regularity and harmony which characterized the proceedings at

Saratoga, so markedly in contrast with the preceding meeting at Niagara, proved most conclusively that the differences existing last year could not be attributed to a defective constitution, but to a violation of, or in fact, an *utter disregard of the constitution.* The entire session at Saratoga was conducted with some *slight* modifications, so far as the order of proceedings was concerned, under the operations and rulings of the old constitution, and yet order and harmony prevailed. That there are defects in the constitution which need correcting, is no doubt true; but what is to be gained by the framing and adoption of an almost entirely new plan of organization, as proposed by the committee to whom the subject was referred at Niagara, is difficult to understand. The work of human minds, like the preceding one, it cannot of course be regarded as perfect, and, if adopted, in a few years some dissatisfied spirit, impressed by a sense of its entire unfitness, would no doubt direct attention to the fact in forcible language, and propose, according to his conception, some other plan, which should prove the *ne plus ultra*, to be replaced by another in a few years, and so on *ad infinitum.* It is a great pity that so much valuable time is wasted over the *machinery* of scientific organization, in making, mending, and remaking constitutions. It is not only spending time which should be devoted to the consideration of the important objects bringing men together (who wish, in the few brief days, to receive and impart to one another the results of another year's observation, experience, and reflection), but, in addition, often alienating old friends, and engendering the most bitter and unrelenting hostilities. When the plan of organization under which the Association has been working from its origin was submitted to the convention, there was no effort made to force it upon those present at the meeting. On the contrary, the committee having made its report, the consideration of the subject was very properly postponed until the next meeting of the convention, a year later, when it was calmly and dispassionately considered, article by article, and promptly acted upon, so as not to stand in the way of the vital objects of the organization. Proposed modifications and revisions should be treated with the same deliberation. The attempt to carry such matters *en masse* at the close of the session, when a large number of members had left for their homes or were absent from the meeting, is rather sharp and questionable practice, particularly when a number of old and working members, unconvinced of the propriety or necessity of such change, had desired due time to consider the proposition, and taking it for granted that their just and reasonable wishes in this respect would be acceded to.

Those who have had much experience with associations, in the ever-recurring consideration of constitutions, come eventually to regard the subject with a kind of loathing, and feel as if they would like to be able to say of a society, in whose welfare they are deeply interested, what Rufus Choate did, who, when asked about his *constitution*, re-

plied that he had none, and for years had been living on his *by-laws.* A few simple laws, defining the *objects* and *basis* of the organization, the rights of members, the duties of officers, the regulations for the conducting of business, etc., constitute all that is necessary for the government of such bodies, and anything beyond that is not only unnecessary but injurious. The opinions expressed on this subject are presented under the conviction that it is a matter worthy of mature deliberation, whether time and money are not too valuable to be spent lavishly on such themes.

That the Association meets all the exigencies of the present, and that this meeting was one of the most profitable and agreeable gatherings of the profession ever held, was generally conceded by those present. The influence exerted by such annual conferences on the part of the representative men of the profession is not confined merely to those in attendance, but through their agency is extended to every quarter of the country, awakening new life, and giving a fresh impulse to every member of the profession capable of being affected by such things.

It was unanimously decided that the next meeting of the Association should be held at Nashville; and although it is rather a warm season of the year to go South, it is a matter of congratulation that an opportunity will thus be afforded of demonstrating to our Southern brethren that we entertain none other than the kindest feelings toward them, and therefore gladly meet in the place named with that object mainly in view. In this connection it is gratifying to know that, in the formation of the Southern States Dental Association which met at Atlanta, Ga., as reported in another part of the magazine, all idea of a *sectional* organization was tabooed, and the members concentrated their energies on the establishment of an association upon broad and liberal principles. In this effort they have the hearty sympathy of every member of the profession, and of none more than the writer of this article.

J. H. McQ.

EXPLOSION OF VULCANIZERS.

Two cases are reported in this number of the magazine of the explosion of vulcanizers, one of them resulting fatally, and the other nearly so. The frequency of these explosions within the past few years, many of which have not found their way into the public prints, and the danger to life and limb attending them, make the subject a matter of grave importance to those who are constantly using vulcanizers, and who know not at what moment an explosion may carry death and destruction before it, either to themselves or those who are near and dear to them. As prevention is justly said to be better than cure, the most reliable and effective protection from such accidents is to be found in a knowledge of the cause or causes. To be forewarned is to be forearmed. Defective metal, imperfect workmanship in the construction of

the boilers, or failure on the part of the thermometers to record the temperature, have, in some instances, doubtless led to these results; while this is true, and manufacturers of such articles cannot be too careful in the construction of, and in testing the strength of the boilers before selling them, it is equally certain that in many cases carelessness on the part of those using vulcanizers has been the immediate and sole cause. Nothing, perhaps, is more frequent and inexcusable, not to say culpable, than for a dentist to apply heat to a boiler, and then leave the laboratory for a longer or shorter period to attend to some matter in another part of the establishment, or perhaps, as in the case recorded, to go out on the street and transact business at some distance from the house. It is not an unusual occurrence, we are informed, for those who, as in the case of rural and some city practitioners, divide their attention between operative and mechanical dentistry, to arrange the vulcanizer, apply the heat, and then, entering the operating-room, fill one or more teeth (depending upon the rapidity of manipulation of the operator), and, as soon as the case is supposed to be vulcanized, to return to the laboratory and turn off the heat. This is all wrong; and an engineer on board one of the floating palaces on the Hudson might, with as much propriety, after getting up steam and setting the machinery in motion at New York, turn into his berth and read some interesting book, or, like Rip Van Winkle, go to sleep, until the boat reaches Albany. An accident occurring under such circumstances would be more grave and extended in its consequences; but the principle in each instance is the same.

The mind of an operator may become so occupied by his work as to forget all about what is going on in the laboratory until long after the proper time has passed; fortunate for him, indeed, if he thinks of it early enough only to find that the thermometer indicates a higher temperature than is consistent with safety, and is not awakened to a consciousness of his carelessness by an explosion carrying death before it, causing sadness and mourning on his own hearth and that of others.

In making these comments, it is not with the view of holding up to reprobation the gentleman in whose laboratory this unfortunate accident occurred; on the contrary, he is entitled to one's sympathies, and is no more to blame for what he did than many others who are daily in the habit of doing the same thing, but have so far escaped the consequences to which their temerity renders them liable at any moment. This case, however, may serve to point a moral, and not be without its value in making a proper impression, and proving an important lesson to others, thus averting some more wide-spread calamity in the future. It is with this view of the subject, and animated by an imperative sense of duty as editor of a journal devoted to the interests of the profession, that these opinions have been advanced.

While correcting the proof-sheets of the above, my attention was

called by the inventor to an ingenious and apparently reliable safety-valve for vulcanizers, constructed by Dr. J. A. Straight, of Albion, New York, which he proposes to manufacture for the profession. In this connection it is proper to say that the fusible plug which is in use as a safety-valve, and claimed to melt at a temperature of 360°, and thus admit the escape of the steam, has in a number of cases proved unreliable, as the temperature has been carried to a much higher degree and explosions have occurred in boilers where this plug had been introduced, and remained undisturbed notwithstanding the explosions.

J. H. McQ.

CORRESPONDENCE.

LETTER FROM DR. SANSOM.

The accompanying letter from Dr. A. Ernest Sansom, and the pamphlets referred to by him, came to hand as the matter for the magazine was going to press. As the subjects treated of in the letter are of decided interest in respect to the *modus operandi* of anæsthetics, the contents are presented to the readers of the Dental Cosmos. The writer is one of the most indefatigable investigators of the action of anæsthetics in England, living, as one who was with him some time has told me, almost in an atmosphere of chloroform at the period when engaged in preparing his valuable treatise on "Chloroform, its Action and Administration." Although disposed to regard the action of anæsthetics as due to a direct impression made by them on the nervous system,—a conclusion which some experiments recently performed by me have appeared to confirm, and an account of which will be published in a future number of the magazine,—it affords me much pleasure to have an opportunity of presenting somewhat opposite conclusions, emanating from one whose opinions, as an earnest seeker after the truth, are entitled to respect and consideration. Of the opinions advanced by him in the pamphlets alluded to, liberal extracts will be made for a subsequent number.

29 Duncan Terrace, City Road, London, July 31st, 1869.

Dr. J. H. McQuillen.

My dear Sir,—The other day, in glancing over the journals at our College of Surgeons, I noticed a paper written by you which interested me very much; it was quoted into a New York medical journal. The paper contained observations by yourself upon the action of anæsthetics upon the blood corpuscles. I believe your conclusion was that anæsthetic agents have no appreciable effect on the integrity of the blood corpuscles. I fancy you imagined that our views might be at variance, but I assure you we have much in common, and I can corroborate you in most of your deductions. My memory is unassisted, so I may be wrong in my conception of the general tenor of your remarks, but I believe that—(1) your estimate of the action of strong chloroform upon the blood corpuscles is about identical with my own. (2) I believe that

you have not found the more feeble influences of chloroform produce such results as I have noted. I think that depends on the difference in the mode of our investigation. I placed a single drop of frog's blood upon a glass slide; exposed it for periods varying, in different experiments, from two seconds to two minutes, to the vapor proceeding from an open bottle of chloroform, then covered it by a glass film, and immediately examined it by the microscope. The appearances are seen in Figs. 2, 3, and 4 of the plate which I forward, with a pamphlet, of which I beg your acceptance. I find that those corpuscles with which the vapor does not come in direct contact are uninfluenced. Results, therefore, will absolutely vary with the thickness of the stratum of blood used. I am fully prepared to acknowledge that the appearances may not be the result of the direct action of the anæsthetic; the influences (*a*) of drying (*b*) of the air itself may, with a considerable probability, account for many of the changes.

(3). I perfectly agree with you, that in the circulating blood no change of form can be noticed, but there is frequently manifested a tendency of the corpuscles to aggregate together.

I fancy you have (and that quite probably with perfect justice, from my mode of expressing it) a little misapprehended my course of argument upon the action of anæsthetics on the blood. Probably you believed my observations on the blood corpuscles the cardinal fact on which I based my theory of narcotism from suspended corpuscle-oxygenation. It was, in my mind, quite secondary.

My argument would, in my own mind, stand thus:

A. We have no evidence that in anæsthesia there is any direct union between the anæsthetic and nerve matter. Evidence tends rather to the contrary conclusion.

B. We have no evidence that in anæsthesia there is (as some have held) any impaired *oxidation of nerve matter*. We have no evidence whatever that the normal functions of nerve are due to any oxidation of its substance, much less that the absence of these functions are due to the impairment of oxidation.

C. We have positive data to this effect: that the suspension of supply of arterial blood can impair nerve function, and that impairment of the quality of the blood (suspension of oxidation) will impair nerve function.

D. We find that anæsthetics cause contraction of the channels of arterial blood-supply. Conversely (as in narcotism from cold), where there is adequate contraction of arterial vessels, there is narcotism.

E. We find that anæsthetics added to the blood impair its powers of aeration (see Harley's Experiments). How do they effect this impairment? The only positive data on which we can base any answer are—(1) the fact that anæsthetics do, when added to the blood, impair its form and integrity; we can argue, a fortiori, from the observed effects of the more concentrated influences to the possible effects of the feebler ones; (2), or, that these agents have a chemical action on the proteinous matter of the blood corpuscle.

I contend that in D and E we have a sufficient explanation of the phenomena of narcosis. I am deeply gratified, my dear sir, with your kindly expressions toward myself. I thank you for the observations you have made, which I consider of great value.

I am yours, very truly,

A. Ernest Sansom, M.D.

SELECTIONS.

ARTIFICIAL DENTURES.

BY JOHN ALLEN, D.D.S.

"It is generally conceded that America has better dentists, and more of them in proportion to population, than any other nation on the globe; they are doing all in their power to stay the progress of the loss of human teeth with which we are afflicted, and their timely aid has been crowned with unparalleled success. But still, the immense number of teeth that are annually lost causes a great demand for artificial dentures—a large and important branch of dental practice.

"In the construction of these substitutes we should approximate as nearly as possible to the natural organs, keeping the mind's eye upon at least three important points to be attained, viz.: mastication, enunciation, and restoration of the natural form and expression of the teeth, mouth, and face. But how to attain these ends under all the different circumstances we meet with in this department, is a problem not so easily solved as many suppose; for artificial dentistry differs widely from any other branch of business pertaining to mechanism.

"For example, the mechanic works by well-known rules and laws, that have been long and well established; and he follows the same routine with his rule, compass, and square, that thousands of others did who preceded him, all producing the same practical results. The architect of the present day has the same well-established principles to guide him now that were employed by the ancients.

"The different styles of architecture known as Doric, Ionic, and Corinthian, were the favorite orders among the Greeks and Romans in their most palmy days, and these orders, with slight modifications, have been transmitted with mathematical precision to the present time.

"Watchmaking is all done by fixed rules, which the workmen have only to follow in order to produce good time-pieces. Thousands of those little wheels are made just alike, and placed in cases in precisely the same relative position to each other, and all will serve exactly the purposes intended. Numerous branches of mechanism are successfully pursued by men of moderate capacity, by simply adhering to certain fixed rules and principles in executing their work.

"But, in the construction of artificial dentures, there are no fixed rules to guide the dentist, for he has no two cases alike; therefore a rule that would apply in one instance, would not hold good in another. If he should make a thousand sets of teeth, all just alike, upon one model, he would find but one set out of that whole number that could be worn, and that only by the one person from whose mouth the model was taken. Therefore, instead of working by rule and scribe, as the mechanic does, the skillful dentist is ever devising ways and means to meet the various requirements of each particular case. Let us look for a moment at some of the manifold varieties of cases that occur in dental practice. For example, one set of teeth must be long, another short, another large, another small. One patient requires prominent teeth, another those that recede; some sets should be irregular, others symmetrical. Mrs. Brown requires dark teeth, Mrs. White light ones, and Mrs. Jones a shade between. Miss Prim was extremely well satisfied with herself, until she lost her teeth; and in having them replaced, she must have her own natural, lovely expression again, or she will

be unhappy the rest of her life. In order to produce a pleasing and natural expression of the teeth, they should be in perfect harmony with the other features of the face. It is not always the most beautiful and symmetrical artificial teeth which appear best in the mouth. On the contrary, slight irregularities often appear the most natural.

"The teeth give character to the physiognomy of persons; therefore as great a variety of expressions should be given them as there are individuals for whom they are intended. Here the skill of the artist is required in order to avoid an unnatural contrast, that would lead to detection; for you will recollect, it is the height of art to conceal art.

"'The dentist who is a true artisan is not ambitious to have his work bear the impress of artificial teeth, but on the contrary, that they should possess that depth of tone, natural form, and truthful expression which characterize the natural organs.

"'Varying the *position* of the teeth will change the appearance of the mouth, just in proportion as they differ from the natural teeth. Hence, in many persons, their former expression is entirely lost, and distortion has taken the place of symmetry.

"'A want of taste and skill in the construction and adaptation of artificial teeth results in rude and graceless work, which contrasts widely with that of the true artisan, who carefully studies the tone, position, and expression of every tooth, and restores the harmony which nature had originally stamped upon the features of his patient.

"'A few slight touches of the brush in the hands of a skillful artist, will change the whole expression of his picture. So with the teeth; a slight inclination, outward or inward, or variation in length, will change the entire expression of the mouth.'

"Again, the deflection of the various muscles of the face, consequent upon the loss of the natural teeth, presents another class of physiognomical defects, which also comes within the range of dental practice; and the time has come, when the dentist is expected to raise the sunken portions of the face to their original contour by artificial means.

"Whether this *could* be done without injury to the muscles thus raised, remained a problem to be solved by an American dentist. This question being settled for all coming time, that no injury results from wearing properly constructed dentures with attachments for this purpose, it has now become a practical and important feature in dental prosthesis. The sunken portions of the face can be raised by means of attachments or prominences made upon the denture of such form and size as to meet the requirements of the various cases that are presented to the practitioner.

"In view of the facts here presented, and of what is required of the dentist of the present day, we would urge the importance of a higher standard of qualifications in this department than seems to have been attained by a majority of those who are engaged in this branch of our profession. These qualifications may be classified as follows:

"1st. Surgical, embracing especially all operations pertaining to the preparation of the mouth, and restoring the same to a healthy condition. 2d. Mechanism, or all that which pertains to the manual execution of the work, including impressions, models, dies, plates, mounting of the teeth, etc. 3d. Dental chemistry in general, and especially of the chemical properties of the various substances used for artificial dentures, and the mode of preparing and compounding the different minerals, fluxes, oxides, etc. that are employed in forming dental substitutes. 4th.

Metallurgy, including the different processes of working, alloying, and adapting the different metals used in this branch of our profession. 5th. Anatomy, especially of the bony framework, and muscles of the head and face, including the different locations, connections, and functions of all the parts which give form and expression to the features of the face. 6th. Artistic qualifications which combine all of the preceding requirements, and constitute the acme and crowning point of the whole.

"As the necessity for these qualifications is self-evident in the construction of artificial dentures, we will dwell only for a moment upon the last two named, as they seem to be practically the least understood by many in our profession.

"The face, as you are aware, is formed of different bones and muscles, which give it shape and expression. When the teeth are lost, and a consequent absorption of the alveolar processes takes place, several of these muscles are liable to fall in or become sunken, in a greater or less degree, according to temperament. And, in order to restore them to their former position, the dentist should be familiar with the form and position of every bone of the face, and know the origin and insertion of every muscle, what ones to raise, and where to apply attachments to the denture; otherwise, he may produce distortion instead of restoration, by underlaying other muscles than those intended to be raised. Here again, the artistic skill of the dentist is brought into requisition. He should study the face of his patient as the artist studies his picture, for he displays his talents not upon canvas, but upon the living features of the face; and of how much more importance is the living picture which reflects even the emotions of the heart, than the lifeless form upon canvas! In raising the different muscles of the face, the true artist will carefully avoid producing a stiff, restrained, or puffed appearance. He will place the prominences upon the dentures in their proper position, and make them of such form and size as to allow the muscles to rest, move or play upon them, with perfect ease, that they may again reflect those sensitive emotions which tell of the inner workings of the mind. Or, to use the language of Shakspeare, 'Your face, my Thane, is as a book where men may read strange matters.'

"Another important consideration in the construction of artificial dentures is, that the materials of which they are formed should be incorrodible or chemically pure. * * * * * * *

"This purity of materials we have in the continuous gum work, when properly made, as none of the materials used are corrodible in the slightest degree in the mouth. Again, all the essential points here referred to can be attained by this mode of constructing artificial dentures. But too much reliance should not be placed upon the mode, for however perfect this may be in itself, artistic taste, skill, and judgment are necessary to direct the operator in his manipulations.

"Two artists (so called) may employ the same method, use the same paints, brushes, canvas, etc., in painting a picture. One will produce a perfect prototype of nature, with all the delicate shades and tints peculiar to her art; while the other makes a mere daub that is worthless. The same difference exists among men in various other branches of art and science. In conclusion, allow me again to urge upon our brethren the great importance of bringing into requisition a much higher order of talent in the artificial branch of our profession than has heretofore been employed by a large number of dentists, whose ambition prompts them to do the cheapest, not the best work."—*Dental Register.*

DEATH CAUSED BY THE EXPLOSION OF A VULCANIZER.

At a little after eight o'clock this morning our community was shocked and saddened by the explosion of a " vulcanizer " in the office of Dr. N. Chittenden, instantly killing a bright and pleasant little boy named Freddy Foresman, about seven years old.

Dr. Chittenden had come to the office before eight o'clock this morning; had lighted the gas stove under his " vulcanizer," and, after regulating it to the proper degree of heat, had gone out for a few minutes. While absent, little Freddy came in, and an explosion took place while he was standing near the vulcanizer, killing him instantly, breaking his lower jaw and tearing his collar bone from the breast, the muscles being badly lacerated ; and when persons, attracted by the noise of the explosion,—which was as loud as that of a heavily charged musket, and shook the building,—entered the room, the little boy was found lying dead on the floor.

A coroner's jury was impaneled by Justice Woodward, to hold an inquest, before whom testimony was taken, which we condense as follows:

Dr. A. H. Van Norstrand found the child on the floor, with his feet about five feet from the vulcanizer, with his head turned to the right, and surrounded by a pool of blood under the neck and shoulders. The vulcanizer had apparently been split open from the top to the bottom and turned inside out, the copper boiler having partly inclosed its galvanized sheet-iron sheathing and partly buried itself in the wounds on the neck and face. On the right side the lower jaw was broken in two places, and the flesh was cut and torn away down the neck and for an inch below the collar bone, lacerating the muscles badly, and tearing the collar bone loose. The left jaw was also broken. There was no appearance of scalding or sign of water. The vulcanizer was about the size of a quart glass fruit jar, and its metal, which was copper, about a twentieth of an inch thick, was so hot ten minutes after the explosion that he could not hold it. He thought death was caused by the blow from the exploding vulcanizer.

Dr. Chittenden had lit the gas under the vulcanizer, from which it was separated by wire gauze to distribute the flame, got it to the proper temperature, regulated the gas to keep it about there, and gone out on business, having been absent some fifteen minutes. He had often left the instrument thus, and never thought there was any danger. The degree of heat usual was 320 degrees ; an escape was provided for by fusible metal, which would melt when the heat rose a little above 400. He was confident that he put over half a pint of water, about the usual quantity, in the boiler last night, and he put the flask with teeth in this morning. He had used the instrument some eight or nine years, and never thought of its wearing out. Teeth could be vulcanized without steam, but it was regarded better to use it. He thought the pressure of steam when fully heated about eighty pounds to the square inch. The cock regulating the gas was easily turned, and might possibly have been turned by the child ; a slight increase of gas would drive steam up beyond the capacity of the machine, which was of Whitney's patent.

The jury rendered a verdict that " the death was caused by an accidental explosion of a vulcanizer, and from the evidence before us, that no person is properly blamable for the explosion."—*Madison* (Wis.) *paper*.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEORGE J. ZIEGLER, M.D.

"*Natural Selection.*—The following, from the *London Quarterly Review*, is so terse and clear an exposition of Darwin's theory of natural selection, and presents such interesting facts bearing upon a subject now attracting universal attention in the scientific world, that we give it a place in our columns.

"Mr. Darwin's theory is based on a very few groups of observed facts, and on one demonstrable principle. The first group of facts is the *variability* of all organisms descended from the same parents; a variability not confined to external form or color, but extending to every part of the structure, and even to constitutional and mental characteristics. This variability is found to be one of the most universal facts in nature. It is not common or general only, but absolutely universal. Every one knows from his own experience that no two individuals of a family, whether human or animal, are absolutely alike, but no one knows the large amount, or the infinite phases of this variability, but the naturalist or the breeder.

"The fact of universal and all-pervading variability being proved, it is next shown that every kind of variation can be accumulated, by the simple process of choosing from a great number of individuals those which possess any given variation in a marked degree, and breeding from these. It is found that in the next generation, the offspring do not, as might perhaps have been supposed, cease to vary further in the same direction, but generally vary from their parents as a centre in every direction, and, if a large number of individuals are produced, a considerable increase of the first variation may be obtained. For example, the wild jungle cock (*Gallus bankiva*) has an average size about equal to that of our smaller kinds of domestic poultry, and out of thousands or millions of individuals none are ever so large as the 'Shanghai,' or so small as the 'Bantam' breeds. Yet these are descended from the same race, made permanently larger or smaller by the process above described. In pigeons, the bill, the feet, the wings, and the tail have been altered in size and form to an extent nowhere seen in the original wild stock, and Mr. Darwin has shown that the bones and internal organs are capable of modification to an equal extent. The power of accumulating every kind of variation is therefore proved, and this is the very corner-stone of the theory, and that which best distinguishes it from all hypotheses of transmutation of development that have preceded it.

"Another fact of importance is, that all living things have the capacity of increasing in a geometrical ratio. If a pair produce ten young ones once during their lives, and these breed at a year old, there will be nearly 20,000,000 produced in ten years. Many animals, and most plants, have far greater powers of increase than this, and even the slowest breeder of all, the elephant, would, in five hundred years, increase from a single pair to 15,000,000. But we know that in any country once stocked with animals and plants, the number of individuals may fluctuate slightly, but never regularly increases.

"Taking an average of all the species, it certainly remains nearly stationary. It follows, therefore, that the deaths every year are almost exactly equal to the births. If the number of sparrows in England is on the average half a million, and if a million young ones are hatched every year, then before the next year a million sparrows must die. So in a forest of oaks, the number of trees cannot increase on the same space of ground, yet millions of acorns are dropped annually, and would all become oak trees under favorable conditions, but all must die before maturity till an oak falls and leaves room for some of them. Now when, according to our supposition, a million sparrows die every year, what is it that determines which individuals die and which survive? We know that wild animals die of diseases, of hunger, of cold, by the attacks of enemies, and perhaps from other causes. Will it be the healthy or the sickly that will die of disease—the strong or the weak that will die of hunger—the well-feathered or the poorly-feathered that will die of cold—the active and wary or the slow and careless that will be killed by enemies? We can only answer these questions one way. We are as sure of the average result as we are that an insurance company which charges the ordinary rates to all people with consumption and heart disease would soon be bankrupt; and we may well express it by the term—'survival of the fittest' (this term was first used by Mr. Herbert Spencer in his remarkable work, 'The Principles of Biology,' and its more general adoption would alone answer some of the popular objections to Mr. Darwin's theory)—a term which states the absolute fact, that those best adapted to survive do survive, and those least adapted die. This is Mr. Darwin's celebrated theory of 'Natural Selection,' but which is more properly a self-evident principle or axiom. Having been led to it by the analogy of the choosing or selecting by man of certain varieties to continue the breed, while others are neglected or destroyed, he personified the various natural causes which led to the preservation of the half million and the death of the million, and termed them 'natural selection.' But people are continually forgetting that the term is an analogical one, and object over and over again that 'selection' implies a selecter; whereas, if they would take pains to understand the thing, instead of puzzling over the mere term, they would see that the preservation of those best fitted to live was as much the secondary result of the powers of nature as is the arrangement of sand and pebbles by water, or the selecting of leaves to be drifted into heaps by the wind, while the stones and sticks are left behind.

"Fully bearing in mind these great and demonstrable facts—the universal variability of all organisms and of all their parts—the possibility of accumulating these variations in indefinite directions—the enormous reproductive powers of all living things, and the mortality equal to the births—and, lastly, the necessary survival of the fittest—we shall be able to see that the changes in external nature, animate and inanimate, continually going on, must produce indirect effects vastly greater and more important than any which, as Lamarck supposed, they can produce by their direct action on individuals or species.

"Let us take first the differences of color in animals. These are absolutely inexplicable on Lamarck's theory, for we do not find that any change of conditions produces definite changes of color; still less does it produce the varied spots, lines, bands, and patches of color that occur in animals. Neither have the motions of animals, their desires,

or their food been proved to produce any definite effects on their colors. But we know that color is the most variable of all an animal's characters, and yet, in a state of nature, color, as a rule, is very constant in each species.

"Mr. Darwin has shown, however, that color is often intimately associated with other constitutional peculiarities. In Virginia, the paint root (*Lachnanthes tinctoria*) is eaten by pigs, and makes their hoofs drop off. But black pigs are uninjured by it. Consequently, in places where this plant is abundant, the farmers never keep any but black pigs, as no others can be raised except in confinement. Here we have a beautiful illustration of the mode of action of 'natural selection.' The pigs of Virginia are not all born black any more than in other countries, but those of all other colors soon die, and therefore, in a state of nature, a black race would be produced; and, from the powerful action of the law of hereditary descent, there can be little doubt that in time the litters would consist almost entirely of black pigs. If after this had happened it were first discovered that white or brown pigs could not live in the district, we should have a striking example of adaptation; but the adaptation would evidently be an adjustment brought about by the simple law of 'natural selection,' or 'survival of the fittest,' and the rigid extermination of all individuals not adapted to the surrounding conditions. It can be easily seen that in this case 'natural selection' does not imply a personal selecter, since exactly the same result must happen whether the farmer kills off the white pigs himself and turns the black ones loose, or turns out all together.

"This case, although curious, is by no means isolated. White terriers suffer most from distemper, and white chickens from the gapes. In Sicily the *Hypericum crispum* is poisonous to white sheep alone. White horses suffer severely from eating honey-dewed vetches, while chestnuts and bays are uninjured. Purple plums in North America are subject to a disease from which green and yellow plums are free. Again, the white pigeons of a flock are the first to fall victims to the kite. White rabbits of a very hardy kind have been turned loose but failed to maintain themselves, and black fowls on the west coast of Ireland are picked off by sea-eagles. Here we have the explanation of the otherwise puzzling fact, that white quadrupeds and birds are so rare in nature, although abundant in all domestic animals; and the explanation is all the more satisfactory because it accounts for the exception to the rule in the case of many arctic birds and quadrupeds, as well as of sea-birds, for to these the white color is a protection instead of a danger. Now, this same principle will apply to structural and constitutional peculiarities and to habits.

"Man can accumulate variations either in the root, the leaf, the flower, or the fruit of plants, their color, odor, or taste; in the size, swiftness, or scent of dogs; he can alter the bill, the feet, the tail, or the habits of pigeons; can increase the milk of the cow or the fat of the pig; can alter the length of ear in the rabbit and horns in the bull, or can attend to two or even more of these points at once. In like manner the law of 'survival of the fittest,' by simply determining which out of the immense surplus annually born shall be the parents of the next generation, must lead to the modification of every part of an animal's organization that affects its welfare—that is to say, sooner or later of its whole organization. So long as the changes of land and sea, of

which geology assures us, and their concomitant changes of climate, of soil, and of vegetation, and of the distribution of animal forms are going on, each species in turn must be exposed to new conditions and new dangers, must have to live upon new food, or to struggle with new enemies. Those whose organization is sufficiently flexible to furnish in each generation favorable variations, will become adapted to the new conditions, and will appear as the new or representative species of the naturalist; such as could not vary quickly enough would die out, and furnish the extinct species whose remains the palæontologist disentombs.

"Here we have, at all events, a real and a powerful cause in action, and one which is accurately defined, and has been copiously illustrated by observation and experiment. No occult powers are postulated, but instead of them demonstrable groups of facts; and Mr. Darwin has developed his theory so fully, and has shown it to be in accordance with such a vast mass and variety of phenomena which on any other hypothesis are unintelligible, that it has commanded very general acceptance, especially among geologists with whose general doctrine it so well harmonizes."—(*Scientific American.*)

Cranial Deformity.—"In a paper recently read to the Ethnological Society, on 'The Cranium and its Deformities in Relation to Intellect and Beauty,' Dr. King arranged the deformities of the cranium as artificial and natural. Of deformity artificial, the Flatheads afford an example. They comprise several tribes in the neighborhood of the Columbia River of North America. This custom of flattening the head is prevalent along the northwest coast of America, from Salmon River to Unqua River, but it has also been observed in other parts of America, and is known to have prevailed among the ancient Peruvians. The burying-ground of the Flatheads is the disputed Island of San Juan. It is a mere rock, with but a few trees. The flat head was maintained by Tiedemann, Pentland, and Morton to be a natural formation, upon examination of the flattened skulls found at Titicaca. It has since been found by an Arctic traveler, Ross-Cox, that it is an artificial deformity, and the process adopted for producing it is accurately described in his Travels, and in all the works on ethnology—by Catlin, for example. The natural deformity was the main point of the paper, and Dr. King maintained it was going on in civilized life, and that, in the artificial deformity, there was 'uniformity of error;' in the natural deformity there was non-conformity. It was the mode of nursing that gave rise to it. The child, for instance, is nursed on one side, there being a loss of one breast, or the mother has twins, and she nurses one child on one side, and the other on the other side; or she is a wet-nurse, and she nurses her own child on the one side, and her foster-child on the other. This mode of nursing necessarily inclines one side of the head downward—it may be the right side, or it may be the left side. Now, as the brain necessarily forms the brain-case, as the nut forms the shell, the brain in its growth, which is very rapid in early life, necessarily carries the several bones of the head, now incomplete, to the depending side, and thus the head of the child is larger on the depending side than the opposite for life, if not corrected before the several bones of the head are consolidated into one mass. Thus, the cranial vault is deformed, and, in proportion as the cranial vault is deformed, so is the face. The

cranial vault of the European is well represented by the egg of the turkey. The forehead represents the apex of the egg, and the back head the base of the egg; reverse this, and the base of the egg will represent the forehead of the face, and the apex the chin. Deformity of face is, therefore, necessarily the result of deformity of the cranial vault. A further deformity of face takes place by the child sucking its thumb, the index finger being placed as a rest on the nasal bones, that inclining them to one side, either right or left, as the child takes to its right or left thumb to suck. Dr. King believes that intellectual deficiency is due to this cranial deformity. In order to obviate it, Dr. King has taken a hint from the Esquimaux. He found in his visit among them that they nursed their children from their back. The child is placed at the back, and by a shrug of the shoulders is brought under the right or left arm as the mother desires; thus the right head and left head are depending alternately. Mr. Baynton and Messrs. Cole and Williamson exhibited a series of drawings illustrative of deformity of European heads, and among them several heads of acknowledged ability."—(*Med. Times and Gaz.*)

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Hygiene of Sunlight.—"Inasmuch as a few physicians, and very many nurses, still adhere to the pernicious practice of darkening sick-rooms, I would say a few words concerning the hygienic importance of sunlight. The chemical influence of light may be inferred from the effects resulting from its absence. Among these are, arrests of development in various degrees; scrofulous maladies; anæmic conditions; œdematous and dropsical affections; irritability of the heart and nervous system; tendency to syncope and hemorrhages, etc. Goitre and cretinism are also supposed to depend to a great extent on insufficiency of light. Dr. Forbes Winslow, quoting Virchow, says: 'It is a well-established fact that, as the effect of isolation from the stimulus of light, the fibrin, albumen, and red blood-cells become diminished in quantity, and the serum or watery portion of the vital fluid augmented in volume, thus inducing a disease known to physicians and pathologists by the name of leukæmia. * * * * The absence of these essential elements of health deteriorates, by materially altering, the physical composition of the blood, thus seriously prostrating the vital strength, enfeebling the nervous energy, and ultimately inducing organic changes in the structure of the heart, brain, and muscular tissue.' Effects the opposite of these are to be obtained by the free admission of sunlight into the rooms of the sick or convalescent; and this should be done in nearly all cases except those of ophthalmic disease, or where acute cerebral or meningeal attacks forbid it. Dr. Hammond remarks: 'In chlorosis, scrofula, phthisis, and, in general, all diseases characterized by deficiency of vital power, light should not be debarred. In convalescence from almost all diseases it acts, unless too intense or too long continued, as a most healthful stimulant, both to the nervous and physical systems. * * The delirium and weakness, which are by no means seldom met with in convalescents kept in darkness, disappear like magic when the rays of the sun are allowed to enter the chamber. I think I have noticed that wounds heal with greater rapidity when the light is allowed to reach them, than when they are kept continually covered.'"—(Alfred L. Carrol, M.D., *Med. Gazette.*)

"*Cancrum Oris.* By Jas. B Burnet, M.D. (*Med. and Surg. Reporter.*) —T. C., æt. 4 years, admitted into Bellevue Hospital, May 31. On admission, found as follows: on the outside of the left cheek there was an unhealthy, sloughing ulcer,—circular in form,—of an inch and a half in diameter, and from one-fourth to one-half inch in depth. This ulcer was connected with extensive ulceration on the inside of the same cheek, by a narrow line of ulcerated surface extending around through the angle of the mouth, cutting back the angle about one-fourth inch. The ulcerations on the outside and inside of the cheek were still separated by a thin wall of muscular tissue. The ulceration commenced on the inside of the mouth. The general appearance of the child was remarkably good. Forty-eight hours after admission this partition of muscular tissue had entirely sloughed away, exposing the inside of the mouth to full view. The lower edge of the opening extended to the base of the alveolar process of the lower jaw. This process itself was unaffected. The alveolar process of the superior maxilla was denuded of its periosteum and mucous membrane, and the bony structure was much affected. One tooth had fallen out, and the others were held merely by the closure of the lower set against them. The superior maxilla was denuded an inch and a half antero-posteriorly, and upward to its orbital process. At this point the ulcerating process became limited by healthy granulations, and the excavations in the soft parts began to fill up.

"In seeking for the cause of the disease in this case, it was found that the child had been complaining for two weeks previous to admission, and had taken, by order of his physician, powders of some gray substance, for four successive nights. On the fourth day the father discovered the ulceration commencing on the inside of the mouth. It seems right to conclude that the disease was caused solely by the administration of *mercury*—as the description of the powders is that of hyd. cum creta.

"*Treatment* consisted in tonics, and potassæ chlorat., internally and locally, under which she rapidly recovered."

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"*Salivary Calculus; Cases, with Remarks.* By Joseph Bell, F.R.C S., Ed., Lecturer on Surgery, Edinburgh.—The following cases seem to be tolerably characteristic examples of a disease not very common, and regarding which little specific information is given in the more familiar text-books:

"'Case 1.—A. B., aged nineteen, called on me in April, 1868, in great mental distress. She was a strong, healthy-looking, and very attractive young lady. For two years she had noticed a tumor under her tongue to the right side of the middle line; but, as it seemed stationary and gave her no pain, she had never mentioned its existence to any one; for some months, however, it had been rapidly increasing, and within the last few weeks still more rapidly, and had given her most acute pain. She was now certain that she was suffering from cancer of the tongue.

"'*Present Condition.*—On opening the mouth, there was seen on the right side of the tongue a red, fungating, angry-looking tumor as large as a walnut, which forced the tongue upward so as to interfere with speech, and certainly had a most malignant-looking aspect. It was of

stony hardness, and contained no fluid. Trusting to her appearance of perfect health, I excised the projecting portion of the tumor with probe-pointed scissors. Considerable hemorrhage followed, and no cavity or calculus was exposed as I had hoped. However, by cautiously continuing my incision into the densely fibrous substance of the tumor, I was at last rewarded by extracting an oval calculus, about three-quarters of an inch in length. The relief to the pain was instantaneous, and in a very few days the tumor had entirely disappeared. There has been no return.

"'Case 2.—Miss F. M., aged thirty, consulted me in December, 1868. She stated that for the last eight years she had noticed a tumor under the right side of her tongue, which had been frequently the seat of uneasy sensations; at times it had given acute lancinating pain, and latterly, from its size, had interfered with speech and deglutition. All the symptoms had been increased during the last twelve months. She had consulted at different times two different surgeons, who had both counseled delay. I found that the tumor was of stony hardness, and that a small portion of it projected forward into the mouth. A free incision enabled me very easily to remove a calculus of peculiar shape, twisted like a ram's horn, and about an inch and a half in length, and of a bright orange color. All the symptoms disappeared along with the tumor.

"'Remarks.—Salivary calculi are generally found at the orifices of the Whartonian ducts, or in those of the smaller ducts of the sublingual glands. (Craigie's *Elements of General and Pathological Anatomy*, p. 829.) They are very rarely found in the duct of the parotid. In most cases, their presence is easily detected by a probe or even by the finger, as they project close to the extremity of the duct, and an incision over them renders removal very easy. Occasionally, even in this comparatively superficial position, they have been the cause of so much irritation as to be mistaken for cancer. (Holme's *Dictionary of Surgery*, vol. iii. p. 970.) Salivary calculi are occasionally described as either complications or causes of ranula; this seems not to be a correct way of putting the case; for though some cases are seen in which salivary calculus has caused by its mechanical obstruction of the duct a temporary collection of saliva behind it, the fluid which is liberated by its removal has not the consistence or appearance of the fluid met with in ordinary cases of ranula. In the two cases recorded above, the calculi were more deeply seated, being rather in the substance of the gland than in the duct, and the second one especially is remarkable for the long duration of the symptoms. In both the walls of the tumor in which the calculi were imbedded were very firm and hard; in neither was there the slightest accumulation of either saliva or the glairy fluid of a ranula. A case recorded by Gross, of Philadelphia (Gross's *Surgery*, 3d ed., vol. ii. p. 479), seems to have resembled mine in the obscurity of some of the earlier symptoms. Probably, if left alone, the natural course of such calculi is, as South says (South's *Chelius*, vol. ii. p. 406), to escape by ulceration into the cavity of the mouth; but my cases showed that this may, in some cases, involve a very long and a very painful process, before any progress in such ulceration results. Excision in every case is easy, painless, and satisfactory. I have preferred, for the sake of brevity, rather to refer to authorities on this subject than to quote them.'"—(*British Medical Journal* and *Half-Yearly Abstract.*)

"*Sclerotitis relieved by Extracting a Carious Tooth.* By C. E. Wright, M.D., Indianapolis.—A young woman, æt. twenty-five, came to me June 7th, with circumscribed sclerotitis about the insertion of the external rectus muscle of the right eye. There had been no mechanical injury to the eye. Patient was experiencing no other difficulty save a severe aching of the second molar tooth on the same side. There was profuse lachrymation of the right eye. Treatment produced no perceptible good untii the carious tooth was extracted, when the inflammation subsided as if by magic."—(*Western Journal of Medicine.*)

Death from Shock following Extraction of Teeth.—The *Med. Times and Gaz.* says that "at Whitefield, William Hilton, aged 14, went to Dr. Birnie to have two teeth extracted, and immediately after the operation had been performed he fell back in a fit of epilepsy, from the shock to the system, and died."

"*Friction in Suspended Animation.*—Thomas Inman, M.D., Liverpool (*The Med. Mirror*), believes that steady friction, rubbing, or shampooing is of great use in suspended animation, and in other cases. It has, in addition to its general value, a special effect upon the muscular structures; and he avers, after closely observing the effects of both for many years, that the remedy of which he speaks is infinitely superior to the use of electricity or galvanism, or that which is now designated by the absurd epithet of 'Faradization.'"—(*Medical Record.*)

Oxygenesis.—"Take a strong solution of chloride of lime, and gently heat it with only a trace of freshly-prepared peroxide of cobalt; a stream of oxygen is evolved, and chloride of calcium is formed. The evolution of the gas is very regular when the liquid is heated to 70° or 80°. All the oxygen is given off, no chlorine being liberated. The chief point is to use a perfectly clear solution of chloride of lime; if a milky or thick solution be used, it will froth.

"The author states the advantages of this method as follows:

"1. The evolution proceeds with extraordinary regularity, and the gas is collected with the greatest ease, which makes the process specially applicable as a lecture experiment. When the mixture has been heated to 70° or 80°, the lamp may, in general, be removed, as the heat of the fluid is then sufficient to carry on the reaction to the end.

"2. The whole of the oxygen is obtained from the material, while only a part is procured by heating peroxide of manganese.

"3. The process has the advantage of greater cheapness than that with chlorate of potash, either with or without manganese."—(*Ann. der Chem. und Pharm.* and *Druggists' Circular.*)

Oxygenesis at the Ordinary Temperature.—"Professor Bœttger says that, 'when a mixture is made of equal parts, by weight, of peroxide of lead and peroxide of barium, and there is poured on this mixture dilute nitric acid of a strength of 98 Baumé, and specific gravity 1·067, a current of pure oxygen, free from ozone and antozone, is given off abundantly. The mixture of the two peroxides alluded to may be kept together in a stoppered bottle in dry state for any length of time.'"—(*Chemical News.*)

"*Carbolic Acid.*—Crystallized carbolic acid becomes *liquid* in warm weather, and solidifies again as winter approaches. The best acid assumes a pinkish hue (which is due to the action of light) by long keeping, but this in no respect renders its use inadmissible for the nicest purpose. We have had thousands of pounds, which, as it flowed from the retorts and crystallized, was white and beautiful as the freshest snow, change in the course of twenty-four hours so as to have some color. No specimen from the best European makers, that we have seen, is free from this liability. Redistillation, a dozen times repeated, does not always suffice to maintain it in a colorless condition for many months."—(*Ibid.*)

Carbolo-Permanganate Potash Solution. By Joseph Adolphus, A.M., M.D., Logansport, Indiana.—"In using carbolic acid, I have found that it makes a far superior application when combined with permanganate of potash, and fulfills indications that are rebellious to other means.

"I have a solution formula for the carbolic acid thus—℞. Carbolic acid crystals, ʒij; rain water, ʒviij. I then take a solution of—℞. Permanganate potash, ℈ij; water, ℥iv; make solution. These are the two standard office solutions. When I desire the carbolo-permanganate potash solution, I proceed as follows:

"℞. Carbolic acid, ℥i; water, ℥viij; solution permanganate potash, ʒiij. This makes a splendid application to inflamed surfaces, and for injecting abscesses, fistulous openings, etc. If too much of permanganate solution is added, the solution becomes cloudy, and finally separates into a muddy sediment, and a supernatent dirty fluid."—(*Ecl. Med. Jour.*)

"*Behavior of Chlorine, Iodine, and Bromine toward a Solution of Permanganate of Potassa.* M. W. Lindner.—The author says, when, to any solution containing a compound of iodine, a drop of a dilute solution of permanganate of potassa is added, the peculiarly characteristic color of the latter substance is changed into brown—that is to say, that iodine is set free and the permanganate reduced. It does not matter whether the original solution of the iodide has an acid or an alkaline reaction, for, in the former case the fluid will be clear and transparent, in the latter turbid. A neutral solution of a bromide is not affected by the permanganate, neither is an alkaline solution; but if the solution of the bromide is acidified with nitric acid, the reaction, on addition of the permanganate, takes place in the same manner as for the iodide solution. A solution of a chloride is never, under any conditions, acted upon by the permanganate. The author states that, even when solutions of iodides or bromides are so dilute as hardly to be detected by nitrate of silver, the permanganate never fails to detect the presence of them, but does not, at the same time, distinguish between iodine and bromine, for which purpose the specially-distinguishing reagents for these two halogens have been applied."—(*Chemical News.*)

"*Production of Soft Sulphur.*—M. Moutier has shown that sulphur heated with $\frac{1}{400}$th of its weight of iodine becomes, by cooling, soft, plastic, and in great part insoluble in sulphide of carbon. He also shows that several organic substances, such as naphthaline, paraffine, creasote, camphor, and turpentine, modify sulphur in the same manner,

when employed in about the same proportions. The temperature to which the sulphur must be heated varies with the nature of the substances added; thus camphor effects a change at a temperature of 230° C., while naphthaline and turpentine require a much greater heat. The author was led to believe that it was the carbon in these substances which was influential, and he therefore made experiments with that body. He found that one part of carbon, with 1000 parts of sulphur, at a temperature of 270° C., effected the same modification."—(*Journ. de Pharm.* and *Druggists' Circular.*)

"*Leather Clippings.*—There are few waste products more difficult to dispose of economically than shavings or clippings of leather. A small portion may be used for tempering steel, in the manufacture of ferrocyanide of potassium, and a few other operations; but these uses dispose of but a small part of the entire waste. For manure, waste leather has no value whatever, as even should it become decomposed, the proportion of tannic acid does more harm to vegetation than good. It is sometimes burned in stoves both as a substitute for fuel, and to get rid of it; but the odor from the combustion is extremely unpleasant, and is sure to excite the remonstrances of the neighborhood. Quite recently a process has been devised by which an important utilization of this material, in various ways, has been effected. It consists mainly in adding to the leather clippings or shavings 3 or 4 per cent. of acetic acid, and 10 per cent. of water, the whole being placed in a copper vessel, which is inserted in a water or steam bath. The temperature is to be kept as low as possible, consistent with the object in view; that of 176° Fahrenheit will effect a solution in three or four hours. The mass will generally, however, require a longer period than this, with constant stirring, as the percentage of oil in the leather often interferes with a speedy solution, and as this oil is injurious in some of the applications of the solution, it is better to extract it previously by boiling the leather in a weak solution of soda, or exposing it to the action of sulphide of carbon. The resulting mass, after cooling, is soft and flexible. To render it stiffer, it is only necessary to wash it out in warm water, so as to remove the acetic acid. To make it softer, 10 per cent. of acetic acid may be used instead of 4 per cent., and a certain amount of glycerin instead of water. The softened material can then be used for printers' rollers, possessing for this purpose many advantages over ordinary glue and molasses. By mixing this mass with rubber it forms an excellent cheap material for overshoes. By dissolving the leather in 7 per cent. of acetic acid, 15 per cent of rape-seed oil or other fatty oil, 15 per cent. of glycerin, and 6 per cent. of water, at a moderate heat, we obtain, on cooling, a material which may be mixed with rubber also, and applied to a great many important purposes, as it possesses nearly all the economical qualities of india-rubber, with but a small fraction of the cost. The solution of rubber to be added may be prepared by means of benzole or sulphide of carbon, to which a small quantity of the flowers of sulphur may be added. This, though not producing a positive vulcanizing, improves in various ways the quality of the mixture. By adding tar to the solution of the leather, instead of oil and glycerin, we obtain a firm, tough material, somewhat like papier-mache, and capable of being used in place of that substance."—(*Phila. Ledger.*)

"*To Take Oil out of Leather.*—A correspondent, Mr. A. D. Fisk, of Newark, N. J., answers a recent inquiry on the subject as follows: 'In the factory where I am employed we use 4 *F. aqua ammoniæ,* which will take oil out without injury to the leather. It must be used two or three times in order to get it all out. First use it and let the leather stand until more comes out, and apply again. This is the only thing that will take it out and not hurt the leather.'"—(*Sci. Amer.*)

Hydraulic Cement.—*The Manufacturer and Builder* quotes from the *Amer. Jour. of Mining* the following "method of making an artificial hydraulic lime, according to the highly successful experiments of M. Vicat, a celebrated French engineer and the author of a much esteemed work on hydraulic cement, who first pointed out the method to be adopted in its formation. It is prepared by stirring into water a mixture of one part of clay and four parts of chalk; these materials should be mixed by a vertical wheel turning in a circular trough, and made to flow out into a large receiver. A deposit soon takes place, which is formed into small bricks, which, after being dried in the air, are moderately calcined. Hydraulic lime, thus prepared, enlarges about two-thirds in volume when placed in water. Like the natural hydraulic lime, it can be completely dissolved by acids. This invention of artificial hydraulic lime has rendered Vicat deservedly famous, as it has been in use for many years in the public works throughout France, and was even employed in the hydraulic masonry of the St. Martin Canal. That it can be made in this country there is no doubt, as the argillaceous or potter's clay required is to be found almost everywhere."

Water-Glass Paint for Floors.—"We learn that a new kind of paint, especially good for floors, is made out of water-glass. It unites not only the qualities of beauty and durability, but is also advantageous as a means of protection against the action of fire. In order to lay on a covering of this paint, first of all the floor is neatly cleaned, then any cracks or crevices between the boards that may exist are luted with a thick dough, made of water-glass and pulverized chalk or gypsum. By means of a stiff brush, a coating of water-glass of the consistency, say, of syrup, is then spread over the floor. Again, in the same manner, a second coating is laid on consisting of water-glass mixed with the desired color. It must, however, be a mineral color, from the fact that the alkalies of the water-glass commonly decompose vegetable colors. This coating having become dry, other layers of water-glass may be thereafter given, until the floor has taken on the required lustrous appearance. In order to give the surface a brightness indicative of polish, it is ground off a little, oiled, and thoroughly dried. In this way a coating for the floor is obtained which is very durable, since the water-glass is not worn away either by means of heat, or yet, on account of its hardness, by means of continued use. As regards beauty and utility, floors coated in this manner are found to be fully equal to the best lacquered or varnished ones."—(*Boston Journal of Chemistry.*)

"*Solvent for Old Putty and Paint.*—Soft soap mixed with solution of potash or caustic soda, or pearlash and slacked lime mixed with suf-

ficient water to form a paste,—either of these laid on with an old brush or rag, and left for some hours, will render old putty or paint easily removable."—(*Ibid.*)

"*Marshmallow.*—It is said that the addition of from two to four parts of finely-pulverized marshmallow roots to calcined plaster of Paris will prevent the mass, when mixed with water, from hardening so rapidly as it commonly does, so as to prevent its applicability to many purposes. It will require nearly an hour to become thoroughly set; and then it will be found to have acquired such an extreme toughness and tenacity as to permit it to be filed, turned, and bored, and otherwise manipulated, almost as satisfactorily as ivory, bone, or meerschaum. Mixed with different coloring matters, an excellent imitation of marble can be produced."—(*Phila. Ledger.*)

Rubber for Cleaning Teeth.—A writer in the *Scientific American* says he knows "from experience that No. 8 gum rings are superior to silk floss for cleaning the spaces between teeth. The rings are not only more convenient to handle, but they slip through the spaces easier."

Platinized Lead for Galvanic Batteries.—Dr. J. Hough states, in the *Boston Journal of Chemistry*, that "the glass cell used to hold the acid solution of the ordinary Smee battery may be entirely omitted, and a platinized lead cell used as a negative plate in its stead. The platinizing of the lead is an exceedingly simple process. To the physical technologist, electro-platinizing suggests itself, and needs no explanation. Practically, however, all that is necessary is to immerse the plates in, or fill the leaden cell with, a weak solution of platinic chloride. A few hours produce a deposit of sufficient thickness."

"*Lubricator for Turning-Tools.*—It has long been known that a solution of camphor in spirits of turpentine is one of the best lubricators for steel tools employed for cutting or rather abrading glass. A file moistened with camphorated turpentine acts rapidly on glass, and by means of a steel drill moistened with the same liquid we have frequently bored holes through thick plates of glass. It has lately been suggested that the difficulty which is often experienced in turning certain metallic alloys (as those of zinc, copper, and tin) in a lathe, owing to their extreme hardness and the readiness with which the cutting tools become blunted, may be entirely obviated by the use of petroleum. It is said that, if the point of the tool while in use be kept constantly moistened with this liquid, the work will proceed as readily as with red hot metal. Steel, tempered to a light yellow, has been turned with the greatest facility by using a mixture of two parts of petroleum and one of oil of turpentine."—(*Manufacturer and Builder.*)

"*Fusibility and Volatility of Metals.*—While engaged with experiments on the intrinsic composition and constitution of various pieces of silver money, made at the Royal Netherlands Mint, at Utrecht, Dr. A.

von Riemsdyk carried on some experiments on the fusibility and volatility of metals, from the published record of which we abstract the following: the metals tin, bismuth, cadmium, lead, and zinc, as chemically pure as they can be obtained, were molten, in order to prevent their oxidation, in a feeble but constant current of pure and dry hydrogen gas. The author found that—(1) the melting of these metals does not, either mechanically or by evaporation, give rise to any loss at all; (2) that *tin*, *lead*, and *bismuth*, when kept in a liquid state, are not volatile at temperatures greatly in excess of their melting points, and that, at a bright red heat, quantities of 2·3433 grms. of *bismuth*, and 4·5183 grms. of *lead*, did not lose by being kept at that temperature for one hour, more than 1 and 0·5 m.m., respectively, by evaporation, while *tin* did not exhibit any volatility at all; (3) that *cadmium* and *zinc*, though completely fixed, non-volatile, at their melting point begin perceptibly to volatilize at a few degrees above that point; (4) that there does not exist any relation at all between the fusibility and volatility of these metals, which may be arranged in the following manner, beginning from the most fusible and most readily volatile:

Fusibility.		Volatility.
Tin	228·5° C.	Cadmium.
Bismuth	268·3° "	Zinc.
Cadmium	320·0° "	Bismuth.
Lead	326·0° "	Lead.
Zinc	420·0° "	Tin.

(5) that the so-called Rose's fusible metal, an alloy of tin, lead, and bismuth, the melting point of which is about 97·5°, and certainly not higher, is not perceptibly volatile when heated to a bright red heat in a current of pure hydrogen gas. Silver, unalloyed, melts at 1040° C., pure gold at 1240 C., while the author found that chemically-pure copper requires a temperature of 1330° C. to become liquid. Neither pure silver nor pure copper, nor also the alloy of silver and copper containing 945-1000ths of the former metal (this alloy is the standard alloy of the Netherlands silver coins), loses anything at all by volatilization when kept for a considerable time at temperatures higher than the melting points of both these metals, and in a feeble current of pure hydrogen to prevent their oxidation. The author has made some of these experiments on a very large scale, having at his disposal large quantities—several hundred kilos.—of these metals in pure and alloyed state; he also describes an ingenious pyrometer devised and invented by him, but space forbids us to enter into further details."—(*Chemical News.*)

"*Soldering and Brazing.*—Soldering and brazing are such well-known arts that many will deem it a waste of space on our part to say anything on the subject. The following hints may, however, be occasionally useful to machinists, carpenters, and others who may occasionally desire to join pieces of metal together. In uniting tin, copper, brass, etc. with any of the soft solders, a copper soldering-iron is generally used. This tool and the manner of using it are too well known to need description. In many cases, however, better work may be done without the soldering-iron, by filing or turning the joints so that they fit closely, moistening them with soldering-fluid, placing a piece of

smooth tin foil between them, tying them together with binding-wire, and heating the whole in a lamp or fire till the tin foil melts. We have often joined pieces of brass in this way so that the joints were quite invisible. Indeed, with soft solder, and especially with bismuth solders Nos. 19 or 21, almost all work may be done over a lamp without the use of a soldering-iron or fire.

"Advantage may be taken of the different degrees of fusibility of the solders in the table to make several joints in the same piece of work. Thus, if the first joint has been made with fine tinner's solder, there would be no danger of melting it in making a joint near it with bismuth solder No. 16, and the melting point of both is far enough removed from No. 19 to be in no danger of fusion during the use of that solder.

"Soft solders do not make malleable joints. To join brass, copper, or iron so as to have the joint very strong and malleable, hard solder must be used. For this purpose No 12 will be found excellent, though for iron, copper, or very infusible brass nothing is better than silver coin rolled out thin, which may be done by any silversmith or dentist. This makes decidedly the toughest of all joints, and as a little silver goes a long way, it is not very expensive.

"In preparing solders, whether hard or soft, great care is requisite to avoid two faults: first, a want of uniformity in the melted mass, and, second, a change in the proportions by the loss of volatile or oxidable ingredients.

"To obtain hard solders of uniform composition, they are generally granulated by pouring them into water through a wet broom. Sometimes they are cast in solid masses and reduced to powder by filing. Nos. 10, 11, 12, 13, 14, 15 are generally rolled into thin plates, and sometimes the soft solders, especially No. 21, are rolled into sheets and cut into narrow strips, which are very convenient for small work that is to be heated by a lamp. Of course, where copper, silver, and similar metals are to be mixed with tin, zinc, etc., it is necessary to melt the more infusible metal first. When copper and zinc are heated together, half the zinc passes off in fumes. In preparing soft solders, the material should be melted under tallow to prevent waste by oxidation; and in melting hard solders, the same object is accomplished by covering them with a thick layer of powdered charcoal.

"Hard solders Nos. 6, 7, 8, 9 are usually reduced to powder either by granulation or filing, and then spread along the joints after being mixed with borax which has been fused and powdered. It is not necessary that the grains of solder should be placed *between* the pieces to be joined, as with the aid of the borax they will sweat into the joint as soon as fusion takes place. The same is true of soft solder applied with soldering fluid. One of the essential requisites of success, however, is that the surfaces be clean, bright, and free from all rust. The best solder for platinum is fine gold. The joint is not only very infusible, but it is not easily acted upon by common agents. For German silver joints, No. 14 is excellent.

"For most hard solders, borax is the best flux. It disolves any oxides which may exist on the surface of the metal, and protects the latter from the further action of the air, so that the solder is thus enabled to come into actual contact with the surfaces which are to be joined. For soft solders, the best flux is a soldering fluid which may be prepared by

saturating equal parts of water and hydrochloric acid (spirit of salt) with zinc. The addition of a little sal ammoniac is said to improve it. It is not impossible that fluxes of even greater efficiency might be discovered by a little well-directed effort, but for the present these answer every purpose. In using ordinary tinner's solder, resin is the best and cheapest flux, and possesses this important advantage over chloride of zinc: it does not induce subsequent corrosion of the article to which it is applied. When chlorides have been applied to anything that is liable to rust, it is necessary to see that they are thoroughly washed off and the articles carefully dried.

"The following table gives recipes which will be found exceedingly reliable. Some are taken from the *Mechanical Manipulation* of Holzapfel, whose name is a sufficient guarantee for their excellence. For many of the others we can vouch personally.

TABLE OF SOLDERS.

No.	*Name.*	*Composition.*	*Flux.*	*Melting point.*
				Fahr.
1	Plumber's coarse solder......	Tin, 1; lead, 3..................	R.	500°
2	Plumber's sealed solder......	Tin, 1; lead, 2..................	R.	441°
3	Plumber's fine solder.........	Tin, 1; lead, 2..................	R.	370°
4	Tinner's solder..................	Tin, 1½; lead, 1................	R. or Z.	334°
5	Tinner's fine solder............	Tin, 2; lead, 1..................	R. or Z.	340°
6	Hard solder for copper, brass, iron..............................	Copper, 2; zinc, 1...........	B.	
7	Hard solder for copper, brass, iron..............................	Good tough brass, 5; zinc, 1.	B.	
8	Hard solder for copper, brass, iron, more fusible than No. 6 or 7......................	Copper, 1; zinc, 1............	B.	
9	Hard solder for copper, brass, iron..............................	Good tough plate brass......	B.	
10	Silver solder for jewelers...	Silver, 19; copper, 1; brass 1.	B.	
11	Silver solder for plating......	Silver, 2; brass, 1............	B.	
12	Silver solder for silver, brass, iron..............................	Silver, 1; brass, 1.	B.	
13	Silver solder for steel joints	Silver, 19; copper, 1; brass 1.	B.	
14	Silver solder, more fusible..	Silver, 5; brass, 5; zinc, 5...	B.	
15	Gold solder.........................	Gold, 12; silver, 2; copper, 4.	B.	
16	Bismuth solder..................	Lead, 4; tin, 4; bismuth, 1.	R. or Z.	320°
17	Bismuth solder..................	Lead, 3; tin, 3; bismuth, 1.	R. or Z.	310°
18	Bismuth solder..................	Lead, 2; tin, 2; bismuth, 1	R. or Z.	292°
19	Bismuth solder..................	Lead, 2; tin, 1; bismuth, 2.	R. or Z.	236°
20	Bismuth solder..................	Lead, 3; tin, 5; bismuth, 3.	R. or Z.	202°
21	Pewterer's solder..............	Lead, 4; tin, 3; bismuth, 2.	R. or Z.	

Abbreviations: R., Resin; B., Borax; Z., Chloride of Zinc.

"Solders of still greater fusibility might be made of a mixture of cadmium with other soft metals. We have never used the cadmium alloys for soldering, but have heard that they are very tough, and will even bear the hammer. If this be so, they must prove exceedingly valuable. The most fusible of all compounds are formed by adding a small proportion of mercury to the ordinary fusible metals. Such amalgams,

however, do not answer for soldering purposes, being altogether too brittle."—(*The Manufacturer and Builder.*)

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"*Gum for Labels, Postage and Revenue Stamps.*—The following recipe is published in a late number of Dingler's Polytechnic Journal: Five parts of good glue are to be digested for one day with twenty parts of water, after which nine parts of candis sugar and three parts of gum arabic (not cherry gum) are dissolved in it. This solution is then ready to be spread upon paper. It keeps well, does not get brittle nor wrinkled, and does not make the sheets stick together when they are piled upon each other. The following is recommended as a good paste for labels for letters and soda-water bottles: Stir into one pound of a paste of glue and rye-meal, one-half an ounce of turpentine.

"Labels attached with this gum do not get loose in damp cellars. Moreover, if, for convenience' sake, it is desired to gum these labels preparatory to using them, add one-half an ounce of oil varnish and one-quarter of an ounce of magnesia to one pound of the former paste, and use it then."—(*Journal of Applied Chemistry.*)

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Welding Flux.—"George Ede, one of the best authorities on the working of steel, recommends a flux composed of sixteen parts of borax and one of sal ammoniac fused together for an hour over a slow fire, and, when cold, powdered. It is to be used like sand."—(*American Artisan.*)

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"*A Welding Mixture*, by which cast-steel can be joined to cast-steel, or to ordinary steel or to iron, is prepared by mixing calcined borax with calcined lime and calcined sal ammoniac and steel filings. This, when applied to the surfaces to be joined, will promote their union at a cherry-red heat, and consequently without altering either the quality or shape of the two portions thus joined."—(*Phila. Ledger.*)

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Wire Gauze to Extinguish Flames.—"Tar, resin, wax, or other similar substances, when melted in large quantities, often take fire, and are extinguished with great difficulty. A very simple method of extinguishing such flames, consists in having a frame of fine wire gauze so arranged as to allow of its being laid at once over the burning surface."—(*Ibid.*)

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Painless Cutting in Surgery.—"At the late meeting of the British Medical Association (*Lancet*), Dr. B. W. Richardson exhibited a knife consisting of a revolving blade, and which divided with such rapidity that superficial incisions could be made with it without pain. The revolutions were about twenty-five per second, but the speed might be greatly increased. The knife in its action illustrated that an appreciable interval of time is necessary for fixing an impression on the mind, and for the development of consciousness. He hoped he should soon be able to give to the surgeon a small pocket instrument with which to open abscesses, and perform many minor surgical operations painlessly, without having recourse to either general or local anæsthesia."

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, OCTOBER, 1869. No. 10.

ORIGINAL COMMUNICATIONS.

EXPOSED PULPS.

BY C. E. FRANCIS, D.D.S., NEW YORK CITY.

THE operation of capping exposed pulps has of late been revived, and many have been the discussions appertaining thereto in our various dental associations. Gentlemen of acknowledged skill and professional ability have participated in these discussions, and have differed widely in their views, both in regard to the results of repeated experiments and the practicability of ever attempting such operations. One party asserts that the pulps of teeth which are not wholly deprived of vitality may, by a proper course of treatment, be preserved, and their function be re-established. Whether the pulps be freshly exposed, and in a comparatively healthy condition, or are in a state of acute inflammation, it is all the same. Even after a portion of the pulp is fully congested, and suppuration has actually commenced, it is claimed that, by "amputating" or detaching the dead from the living portion, the latter may be so treated as to render it perfectly healthy, and be induced in due time to deposit a sufficient quantity of calcareous matter to afford proper protection from external influences.

Another party will invariably devitalize and remove exposed pulps, giving as a reason that, if once exposed, whatever the circumstances or conditions, they will sooner or later, despite all care or treatment, surely yield up their current of vital power, and if suffered to remain in their caskets, will occasion peridental inflammation, to be eventually followed by alveolar abscess and the loss of teeth thus treated.

Now, here are two doctrines—two extremes, each earnestly supported. In which lies the truth, or does the truth lie in neither extreme? Those who have experimented in this direction, and have met with failures, are charged with stupid ignorance or lack of thoroughness; while they who declare the infallibility of their skill are accused of

either stretching the truth, or negligence or inability to follow up the cases they have treated, and so discover their failures. I see force in each argument, and cannot advocate either *extreme.* But who will say that a tooth containing a living healthy pulp is not far preferable to a pulpless one? And if, in nearly all cases, as is claimed, or a majority of them, this happy result may be attained, is it not a matter worth investigating? It so appears to me. When a healthy pulp is exposed or wounded by an unlucky touch of the excavator, I believe it may in most cases be saved; indeed, I know of several instances occurring in my own practice where this result has been accomplished. I have removed fillings which had been introduced over exposed and capped pulps some twelve or more months after their introduction, and found a beautiful deposit of secondary dentine in each case covering a healthy pulp, as proper tests indicated. If some cases have proved successful, why may we not hope for similar results where the same care and course of treatment is pursued? Our successes should encourage renewed efforts for further success, and it therefore seems advisable to attempt the preservation of every healthy pulp.

The course of treatment I have adopted in such cases is very simple, and has been frequently recommended by others as well as myself. It is this: First, keep at bay the fluids of the mouth, and dry the cavity carefully with a bit of the softest prepared spunk. Now bathe it with pure creasote, until all pain subsides. Cut a small circular piece from a sheet of smooth note-paper and place it directly over the wounded pulp, patting the edges down neatly and cautiously; then fill the entire cavity with a thin paste of oxychloride of zinc. If nicely done, the tooth is not likely to ache, the creasote coagulating the exudation from the pulp, and allaying irritation. If there is no *irritation,* of course there can be no *inflammation,* and the chances of success are more favorable. This should be particularly guarded against, and for this reason I use the paper cap, which not only prevents the chloride of zinc from touching the pulp, but is one of the best non-conducting agents of thermal changes that could be introduced in the same space. If convenient to so arrange it, I would have the tooth thus filled remain in this condition a week or a month, that the zinc may become quite hard; then remove the greater portion of it, and refill with gold. A sufficient thickness should remain to protect the pulp from pressure during the process of consolidating the gold. I would feel almost positive of success in retaining the vitality of pulps, in cases treated as I have described, where their exposure is quite recent. If, however, inflammation has been passed, and the stage of congestion and suppuration has been reached, I should consider the chances of restoration lessened according to the advanced condition of disease.

Some of our ultra friends are so enthusiastic and positive on the sub-

ject of treating and saving exposed pulps, that they seem to care but little whether they open into them or not. Indeed, in cases where the pulp is protected only by a thin layer of partly decalcified dentine, they advise a thorough excavation, even though sure of wounding this delicate and extremely sensitive organ. This is certainly heroic treatment, and I think savors somewhat of recklessness.

The less irritation produced, the more certain are the chances of success.

A PARTIALLY NECROSED TOOTH REMOVED AND REPLACED.

BY THOMAS T. MOORE, COLUMBIA, S. C.

On the 15th of July, 1868, J. A., a young man aged 21, came to me with severe pain in left superior lateral incisor. Upon examination, I found that it had been filled several years before, and there was an abscess, of more than three years' standing, at the apex. I immediately began to treat the abscess, but gave no relief after having made the necessary applications; I administered a dose of morphia subcutaneously, which afforded some relief. The patient was then dismissed, and ordered to return at the end of three days, but on the 16th he came again, having suffered all the previous night. I then attempted to break up the abscess by destroying the sac, and scraping the tooth at the apex of its fang. After the instrument had been introduced, I discovered a peculiar roughness, which I could not remove, and on further examination I found it to be *partial necrosis.* An anodyne was administered, while the necessary preparations were made to remove, fill, and replace the diseased organ. Everything being ready, I commenced by taking a wax impression of the teeth on that side of the jaw, from the left central incisor to the second bicuspid inclusive, and of the corresponding teeth of the lower jaw, leaving space enough between the teeth to admit a spoon or tube, through which he might take nourishment.

A second impression was taken in gutta-percha, to be used as a temporary appliance (until one could be made of rubber from the wax impression). This being done, nitrous oxide was administered, and the tooth extracted. On the end there was about the sixteenth of an inch perfectly dead, which was removed with a pair of nipping forceps; the tooth was then coated with glycerin and folded in a piece of soft muslin. I then filled it as rapidly as possible through and through, burnishing it at *each end.* The cavity was cleansed with tepid water; the tooth was washed in warm water, and gradually forced into its socket. This being done, the temporary appliance was placed on the teeth, and the head bandaged so that the patient could not open his mouth. Next day, 17th, he called; I removed the bandage and appliance; the tooth was very sore

to the touch, very shaky, and somewhat protruded. The rubber appliance was adjusted to the parts, and the jaws bound as firmly together as the appliance would admit; he was then dismissed, and directed to diet on fluids and semifluids, and to remain as quiet as possible. He continued to improve until the eighth day, at which time the appliance was removed. The tooth was found to be much firmer but still a little loose ; the soreness had left it almost entirely, and the tooth had resumed its natural position in the alveolus. It was then firmly ligated to the teeth on either side. The ligature remained on for ten days, when I removed it, and found the tooth to be as firm and as free from inflammation as were any of his teeth. I have examined it repeatedly since, and at no time has it given him the *slightest inconvenience*, nor has the tooth changed in color. Yesterday (September 2d, 1869, nearly 14 months after the tooth was replaced) I invited him to dine with me, and had the pleasure of seeing him use it to good purpose. He vows it is the best tooth he has in his mouth ; and every one will admit that time has proved the operation to be a success.

INOCULATION.

BY J. S. LATIMER, D.D.S., NEW YORK CITY.

In a former communication, I spoke of the danger of inoculating one patient with the diseases of another, and besought dentists to practice great caution, taking care that each instrument which might possibly be contaminated with blood or pus should be thoroughly cleansed after using.

Recently, a very painful illustration of the effects of inoculation has come to my notice, and I deem it advisable to lay the facts, as I understand them, before the readers of the Dental Cosmos, that they may be on their guard.

A dentist (who also practiced medicine), resident in a small town in the State of New York, in operating for a patient suffering from a syphilitic difficulty, contracted the disease from absorption of the virus at a point on one of his fingers where the skin was broken by a hangnail.

Not at first recognizing the disease, and being exceedingly careless with reference to his own health, he employed no appropriate remedies, and was soon unable to continue his practice. The disease progressed rapidly until, at the last accounts, he had suffered paralysis of one-half his body and was likely to speedily "go the way of all the earth."

This is a case of great calamity, resulting from the neglect of a "little thing"—the hangnail on a finger.

The late Dr. John Miller, of our city, had seen the evil results of such

accidental transfers of disease, and was so alive to the danger and commonness of it in medical practice, especially in vaccination, that he frequently cautioned the members of the medical association with which he was connected. It was almost a hobby with him. Of course he was exceedingly careful—but he was human. On one occasion he failed to get his lancet thoroughly cleansed after using. His son (then a lad, but now a practicing physician, and from whom I received these facts) was suffering from inflammation of one of his eyelids, and that lancet was employed on it. The result was that the young man came near losing his eye.

Cases might be recounted in convincing numbers, if it were necessary; but that is needless. The theory is generally admitted, and it is only necessary to call attention to the matter occasionally to make the profession more vigilant and cautious. Forceps, lancets, files, scalers, etc. should be thoroughly cleansed with water after using.

If the skin of a dentist's finger becomes broken, it should be covered with a film of collodion or caoutchouc. The "india-rubber" dissolved in bisulphide of carbon answers well for this purpose.

Of course, no dentist would think of operating in the mouth while he himself is suffering from a venereal disease. To do so would be criminal.

PARTIAL SETS OF TEETH WITHOUT PLATE, CLASP, OR PIVOT.

BY H. D. BENNETT, D.D.S., PARIS, FRANCE.

My attention has lately been called to a new method of inserting teeth. Where four or five are needed in various positions in the arch, they are all attached to a small bar of gold about midway between the point and base of the teeth, so that they may be very readily kept clean around the gums, and the two ends of the bar are plugged into the adjoining natural teeth, by means of a griffe. I have been shown a number of these cases by Dr. B. J. Bing, of this city, the originator of this novel method of inserting teeth, and in each case I have found the patients delighted. The most difficult of these cases are the superior incisors; for example, if you wish to insert a central, a cavity must be made in the palatine depression of the adjoining central and also the lateral, and one in the approximal surface of either of these teeth, about the place where we usually find decay on these surfaces. An impression is then taken which will show these cavities, and a gum or plain plate tooth carefully fitted and backed with gold, observing the precaution of allowing a small point of the backing to extend into the approximal cavity; two little griffes are then soldered to the base of the backing, the ends of which are carefully plugged into the palatine cavities, with gold

foil, in such a manner as will tend to draw these teeth very slightly together, or at least not force them asunder, as might be the case were this precaution not taken.

When this operation is carefully performed for an intelligent patient, the result is always very gratifying, as none of the attachments can be seen without close scrutiny with a glass. It is solid, stationary, and can be cleaned as well in the mouth as the natural teeth, and simply demonstrates the fact that two roots will support three crowns. I have seen a number of these cases which have been in the mouth for nearly a year, and which are perfectly solid and clean,—as perfect as when first inserted.

VULCANITE WORK.

BY W. G. DAVENPORT, MILTON, VT.

THE following is a description of a simple instrument which, in my experience, has proved itself very efficient in vulcanite work.

It consists of a *leather wheel,* to be used upon a lathe with moistened pumice-stone, precisely as we are in the habit of using our rubber wheels and cones. The pores of the leather absorb the moisture, retaining enough stone upon the circumference of the wheel to wear away the rubber, almost as fast as it can be cut with a sharp burr. The use of scrapers and sand-paper may be altogether dispensed with, for the plate is left perfectly smooth and ready for the final polish.

Such a wheel may be easily constructed in the following manner: Take two pieces of sole-leather, about the size desired, and have them sewed or pegged firmly together, with the polished surface outside; then with a pair of dividers mark the centre and circumference, and with a sharp knife cut the wheel into proper shape, making a hole in the centre for a spindle.

By this means, any dentist who is in the habit of using scrapers and sand-paper may save himself much tedious labor.

FETID BREATH, ETC.

BY K. J. P.

I WOULD recommend to medical men, and dentists especially, having moustaches, whenever coming in contact with a diseased breath or any offensive effluvia, to ruffle the moustaches and force as much as comfortable into the nostrils. I find it invariably destroys all fetor, and makes an operation with such more agreeable than otherwise.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

BY W. C. HORNE, D.D.S., NEW YORK.

(Concluded from page 473.)

REPORT AND DISCUSSION ON DENTAL PATHOLOGY AND SURGERY.

Dr. Atkinson's report opened with the statement that discoveries in this field followed one another so rapidly that there seemed to be little definitely settled, and even that was always open to revisions and allowances for error. The seat of function is not generally agreed upon, but the power of appropriation and rejection of substances is usually attributed to the *cell*, though that term is a very ambiguous one. In a sense, all contained within the dermal sheath of the entire body is cell-contents, and this sheath or skin the cell-wall proper. The inception and slight degrees of pathological movements are only perceptible to the informed and specially erudite mind, while grave and continued disturbance is readily recognized by the commonest observers. Hence the beginnings of serious troubles are unrecognized, or permitted to declare themselves, with the delusive hope that they may be overcome by the natural forces of resistance. Instances in illustration might be multiplied, taken from practical experience, of ignorance in diagnosing cases, prognosticating results, and assuming to assess the amount of compensation, in money consideration, for operations quite beyond their power to comprehend, much less ability to execute. These circumstances prove to be obstructions to advancement to the weak, but only incentives to those who are really in earnest.

The author then proceeded to discuss the character and development of cells, tissues, organs, and systems, as dependent upon two principal conditions, namely, plan and pabulum. As men advanced in apprehension of fact and philosophy, the most obvious phases first occupied their attention. First the *bodies* of animals were known to grow and diminish, which suggested the idea that these changes take place in the solids of their bodies; hence the solidal pathology. A closer inspection led to the adoption of the view that all nutrient changes take place in the *fluids;* hence arose the humoral or fluidal pathology. The fluids having become the object of special attention, they were found to differ greatly in the alimentary, vascular, and neural tracts, and the inception of the nutrient movements was supposed to take place exclusively in the neural tracts; hence the neural pathology. At length the microscope was discovered, and by its help elemental bodies were brought within the range of sight and measurement; and hence arose the cellular pathology. Thus, step by step, the minor propositions in organology have been discovered, until we now stand upon the verge of a

grand pathology, including all past phases as requisite to its consummation,—the coming pragmatic pathology.

The various stages of advance of pathological science are shown to have their correspondence in the stages of development of human society, involving a review of the progress of the formation of individual bodies, from the simplest up to the most complex forms. . . . The human system being constructed upon the basis of the destruction of the various inferior types of existence, must include every typal form, from crystal to mucous. . . . . If each constituent cell and tissue of the human body continued in its particular place, and elaborated the function of its locality as long as the body continued in existence, we should then have no disease of any sort, and man would be well until spent in every part, as a completely consumed candle exhales into the gaseous state. Alternation of generations in cells is the prerequisite of growth and development. . . . . The metamorphosis of the tissues,—that is, the common law of the economy,—happily for mankind, does not hold in the teeth; and hence, operations upon them, when properly performed, are permanent in character. . . . Legitimate dentistry consists in the preservation of the natural teeth, in healthy state, to the end of life. . . . . How to do it involves two general propositions: keep the teeth clean, and thus secure their integrity; where integrity is not attained, or is lost by fracture or decay, remove all imperfect parts, and restore the form and size of the tooth.

Dr. Atkinson said the reason that more is not known on this subject is because of the general belief that there is no money to be got out of it, and this idea necessarily closes the field of vision beyond. The majority of our superior men have obtained their knowledge through long and earnest efforts. If he could supply the lost brick in every man's pathology, he should be very happy to supply it. In the matter of operations of a surgical nature, the dental practitioner could put to shame the general surgeon, from his greater experience with and familiarity in the use of his instruments. Dental pathology was much more clearly defined than general, because of its limited range and the uncomplicated character of the structures; hence, more definite and understandable by less erudite minds. In enamel we find the exact analogue of the mineral kingdom, whose mode of aggregation is an expression of the laws of crystallography; and in the dentine, that of the vegetable kingdom, where nutrition is conducted by a to-and-fro movement of fluids in tubes; and in the pulp we have the exact and veritable mode of nutrition known to the animal kingdom, which is actuated by anatomical elements called cells. It is indispensable that it should be first known what *nutrition* means, and that all the tissues work up through their various grades by the formation, from an amorphous mass of chaotic substance, of the anatomical elements distinctive of the tis-

sues. In the mineral kingdom we have the law of crystallography displayed in simplest and most composite expression. In the vegetable this is repeated, with an additional complication and correlation of elements, so that a vegetable is but an advanced mineral, with the plus something that constitutes it a vegetable. In like manner the animal kingdom grows out of the vegetable by the process of disintegration and reconstruction on a higher plane; so that a complete understanding of animal nutrition involves both vegetable and mineral modes of destructive and constructive assimilation; and happy for us is it that the field of our labors is thus circumscribed, and that nature has preserved in the enamel the reminiscence of minerals, and in the dentine that of vegetables, which tolerates interference to such marvelous extent as to kindly submit to the removal of their sickened molecules and admit of their substitution by foreign substance.

The knowledge of these principles has grown so insidiously upon us as to extend the field of study necessary to make diagnosticians, so that to-day almost the most ignorant know more than the fathers of thirty years ago. To be respectably successful to-day, we must be able to master and control the whole field, in diagnosis and in execution of the redemptive procedure in pathological and surgical cases. The principal reason why we of to-day know more than our fathers is the result of the labors of a single man, some two centuries since, who penetrated the field of organology to a depth before unknown, unsuspected, and unlooked for. I refer to the renowned Leeuwenhoek, the inventor of the microscope. Important as was this discovery, it took a century and a half for learned men to acknowledge and appropriate it; and the necessity is upon us now to review by the light of this discovery the works of the best laborers in this field, to eliminate error and demonstrate true positions. The living economy, from lowest crystal to highest mammal, selects and appropriates, from merest pabulum, that of which it stands in need, wisely adjusting each elemental body in the proper relation to its fellows, to construct the harmonious whole of simplest or most complex body, and this is the measure of the physiology of the organic world. In the human organization, the culmination of mind and matter, anything that can exert an influence upon us, may tend to continue this harmonious functional action, or be the point of inception of inharmony, thus inaugurating pathological states. Thinking, in a continuous unintermitted effort, may so derange the nutrition of certain territories as to result in disease; but so few men are capable of thinking, and the many are so ready to accept at second hand and adopt the thoughts of others, that we need not very much distress ourselves with the fear of pathological action from this cause. Irregular breathing has its effect upon all the other functions of the body, by arresting the regular gyrations of circulation and digestion that take their origin in the respiratory func-

tion. Sudden arrest of mental attention and intense concentration of this same effort, are capable of producing this effect of stoppage of respiration for the time, until the mental tension is changed so as to permit the respiratory function to resume its sway. I merely mention these to show how important it is for us to remember how our life is but a vapor, capable of being dissipated by apparently insignificant causes. Imperfect bodies are alone amenable to pathological action; perfect bodies having no foreign affinities. Wherever the enamel is imperfectly formed at the junction of the denticles that constitute the tooth, and leaves open fissures at these locations, I would advise the removal of all the imperfect portion, and even some of that that is well formed, if necessary, to secure a good cavity in which to impact the gold, the form of which I would prefer to be heavy foil—Nos. 8, 10, 15, and 20. It is fashionable to fill with gold now, but the material is not so important as the manner of using it. Any indestructible matter that agrees with the ghost or typal form of the tooth, properly used, should preserve it indefinitely. He had never filled teeth so satisfactorily to himself as in 1869, because the range of his perception was larger, and the means more extended and more readily obtained; the principal of which is heavy foil, and the lead mallet, ranging from 4 to 12 ounces in weight. We often hear one dentist complain of the work of another; but no one is clear in this matter so long as he has the painful or pleasing recollection of the like ignorance of which he complains in another. We are all making advances, and elevate our standard as we advance; hence that which was once excellence is now inexcusable blundering; but many have the happy faculty of forgetting that they ever blundered or fell short of their present high standard. The daily prayer of my life is that I may be able to do no more mischief, do all the good possible, and be the highest expression of dental knowledge and skill on the planet; and I would to God that every one in this presence would heartily and honestly make the same prayer.

There is no pure expression of physiology on the planet except in the mineral kingdom. All former definitions of a cell are a *sell.* The same productive process obtains in a nucleus as in a cell; that which is necessary to a nucleus, or a nucleolus, or any other body capable of being seen, or the unseen elements out of which these are composed, and are capable of conception, but not of perception, are all endowed with three essential elements,—centre, surface, substance. The machinery of sense can only produce an image or impression which is capable of being perceived by the sentiency which is behind all his machinery.

Dr. Buckingham. What is a nucleated cell? Describe it.

Dr. Atkinson. A nucleated cell, to be understood, must be compared with non-nucleated and other cells of varied constitution. Simple cells,

in general, are said to be made up of cell-wall and parenchyma, or inclosed substance, and are the examples of non-nucleated cells. A nucleated cell is this same cell with a central portion of its parenchyma so concentrated as to diffract or reflect some portion of the light pencil, thus making it visible as a darker spot. Multiplied dark points constitute the many-nucleated cells. If we wish to clearly understand what is meant by the nomenclature of the books discussing cellular pathology, we must study each author by himself, for there is no settled agreement as to what shall constitute a correct nomenclature. A molecule is an ideal body; a granule is an aggregation of unknown chiliads of these, and thus becomes a perceptible body, capable of casting its shadow or image upon the retina; itself made up of like constituents, with a similarity of tension, of force and form, the essential requisite of sight. The desire to know, and the attainment of knowledge, hold a relation to each other; but the desire to attain, and the ability to communicate, are not father and son, but great-grandfather and great-grandchild. Hence the greatest novice may puzzle the greatest philosopher to satisfactorily answer, to his apprehension, the queries he may put forth with almost spontaneous effort. The difference between minds is but one of degree, for all have to be developed from out of the dark ocean of non-knowledge. Probably there is no one in this presence that is not the superior of all the others in some of the ripening stages of matter and mind—the correlative necessities of substance in human beings. So let us apply ourselves with all our might to essay the solution of every query that can by possibility arise; esteeming the query itself as the proof and the prophecy of its solution to full satisfaction, on the plane in which it makes itself heard to the mind that propounds it. Molecules, then, may be said to be the result of the tendency to the centre of infinitesimal atoms; while granules are the combination of these at the centre, with a tendency from the centre; thus we have the first letter in our alphabet, of form and function necessary to the nutrition of any body. To bring this within the range of our senses, we must accept this supersensuous process. All this is capable of being brought within the purview of conception and perception, the dual primates of sense. Opacity stands in the way of pursuing the alternations of generations of cells in the production of tissues in the human body; but in the transparent bodies of young fishes, reptiles, and fowls there is enough apparent to sight to suggest and establish the rôle of the elements of the organs of even the highest bodies. Most of that which we have already attained in this direction we owe to our Transatlantic brethren. We as Americans need more of the German persistency of mind that pursues the discovery and proof of a single point in biology during a long and laborious life, and less of the diffuseness of the *omnium gatherum* character of the American type of pathologists.

In consequence of a very little study in this direction, he was no longer able conscientiously to destroy the pulps of teeth under any circumstances; and, in testimony of the confidence with which he relied upon the doctrines here enunciated, he would detail a case which occurred the previous Friday. Female subject; superior canine tooth, exposed pulp; bled; touched with creasote, which arrested bleeding; filled with oxychloride of zinc; proceeded to work in another direction till the filling had set; then cut away oxychloride, leaving sufficient for a cap, and filled with gold; and if it is not a success he should be very much disappointed.

Dr. Buckingham. What takes place between the oxychloride and the pulp?

Dr. Atkinson. There is an affinity between the hydrochlorate of zinc (the fluid used with the oxide of zinc) and the albuminoid substance of the pulp, and at the point where the satisfaction is complete of this affinity an insoluble pellicle is formed. Beyond this, on the inner side, the coagulation is less and less, becoming simply astringent, collapsing the capillaries, driving the blood column—blood corpuscles and all—into the venous radicles, until the recoil of the column by the *vis a tergo* of the circulation reopens the arterial radicles and the capillary system, reestablishing healthy circulation, without the possibility of setting up the inflammatory process, or inducing the exudation of a single pus corpuscle. In case of a very weak pulp, and strong and abundant solution of the hydrochlorate, the coagulation may be effected to the foramen.

Dr. Buckingham. Is there any pain during any part of the operation when the pulp is in a normal condition?

Dr. Atkinson. Exposure itself is an abnormal state; but I have no pain manifested by my patients nor the patients of those who have faithfully followed my directions, as far as reported to me, and I have had many of these. The reason of there being no pain is the free use of creasote. I never purposely destroy a pulp, and that dentist is weak or wicked who would do so.

Dr. Bogue. How would you preserve a pulp that is exposed and partly suppurated?

Dr. Atkinson. That question can best be answered by detailing my procedure in just such a case. A portion of the pulp had sloughed away. I resorted to my usual treatment in such cases, sopping the pulp with creasote, and covering with cotton and sandarac varnish; this dressing was continued for three weeks; at the end of that time the whole of the body of the pulp was converted into a mass of carbolate of albumen, and came away upon taking hold of it, leaving the legs in the roots in healthy and sensitive condition. Six other pulps in similar condition in the same mouth were treated in the same manner without appreciable loss of substance. He was down on the death penalty;

as long as there is life there is hope. Every man in dentistry should bring all his best powers into exercise in the practice of his profession, or he is a sinner.

Question. Does the application of creasote tend to lessen the vitality of the pulp?

Dr. Atkinson. Creasote destroys the periphery, which must be thrown off; and a pulp may be thus destroyed by continued applications. Iodine has such an affinity for some tissues as to stimulate some and destroy others, according to the amount of vigor they possess; the sick being killed and the weak being restored.

Question. Has not the liquid part of the oxychloride of zinc the same action as the creasote?

Dr. Atkinson had never known a case of even a similar action; identity of result is an impossibility, because each exerts its own specific function according to its nature. That they each coagulate albumen, is certain.

Dr. Wetherbee. Is it not true that if the oxychloride of zinc is used, without any excess of the fluid, the same result may be obtained without creasote as with it?

Dr. Atkinson. That depends upon the temperament; in a low organization such a result might be attained. I always use creasote with it.

Dr. Wetherbee, when he finds an exposed pulp which has not bled, applies the oxychloride directly to it, only using creasote when the pulp is exposed and bled by the instrument (as will sometimes happen even to the most skillful operator), and that merely as an astringent. If the chloride of zinc, in coming in contact with the pulp, produces the same result as the creasote, why should the latter be used, unless it is preventive of pain? Is it true that the occurrence of pain endangers the life of the pulp? He believed not; and whether he applied the creasote or the oxychloride directly to the pulp, there was commonly a twinge of pain, which soon passed away, and was followed by no ill results. In those families which had been long under his charge, and where the teeth were inspected at regular intervals, he did not have occasion to perform any operations of this character; they were confined in the main to new patients. During the past year he had found no case of death of a pulp treated by him in the manner described. When he first commenced this method, it was with hesitancy and misgiving; but it proved so satisfactory that he had gone on, and now believes that, whatever the pathological conditions, they can be conquered. And here comes a wail from some one who has been unsuccessful; but he would say to that man, The fault is your own. He accounted for this unsuccess by supposing that the mixture was too hard when applied to the pulp, or that the cap had been broken in inserting the gold filling. Such failures should not be charged upon the material which proved so successful in abler hands.

Dr. Buckingham said he had tried to follow out all the directions given with the greatest care, but had not had uniform results. No surgeon could prognosticate how any case would turn out; no more could any dentist. He took exceptions to Dr. Atkinson's view of the condition of the pulp as acted upon by creasote. After sloughing and the application of creasote, there must be a cicatrix formed; the pulp must have a natural covering; it cannot tolerate the presence of a foreign substance without some degree of inflammation, which was likely at any time to be waked up into an active state.

Dr. Atkinson said there was no cicatrix; merely a new coagulum was formed; a pellicle, taking the place of the natural covering, dentine.

Dr. Buckingham. You cannot form a coagulum which will not allow fluids to pass through it; even if it were as thick as leather, fluids would pass through it. In this way he had lost a number of cases, and therefore could not report uniform success.

Dr. Wetherbee. Suppose there is an exudation from the pulp, is there no provision for taking it up? The oxychloride of zinc is porous; the best ever made will absorb moisture, and for that reason it is the best material for capping tooth pulps. It will absorb *liquor sanguinis*, or anything else, from the pulp, which comes in contact with it. It is sufficiently normal to insure success; and he believed 100 per cent. of cases would succeed if the cap were not broken.

Question. Do you admit that if there is partial suppuration the rest of the pulp may have recuperative power?

Dr. Wetherbee had never seen such a thing, and did not believe in it. There are three classes of exposed pulps which he believed amenable to treatment. The first, where there is simple exposure; to these he applies the oxychloride, pure and simple. The second, where the pulp is exposed and wounded so as to bleed; here he applies creasote as an astringent and hæmostatic, followed by the oxychloride. The third, where the pulp is congested and has given considerable pain; here he would use means to reduce the congestion, and then fill as before, with confidence of success.

Dr. Butler. Do you still think that it is injurious to the pulp to fill the whole of a large cavity with the oxychloride?

Dr. Wetherbee, in reply, mentioned a case which had come under his care, where, the pulps being exposed, a former operator had filled the cavities entirely with oxychloride, and these fillings had been renewed at times for three years; when he (Dr. W.) examined them the pulps were found all dead, and he attributed this to the continued action of an excess of the hydrochlorate.

Dr. Butler thought Dr. Wetherbee's position questionable. How could it be known just how much of the material to use, if such differ-

ent results followed? He had used the oxychloride both as a cap and for an entire filling, and had found it to serve equally well.

Dr. Pearce said he must confess himself one of those who were weak and wicked enough to destroy pulps. Experience had shown him that the treatment which had been detailed was not reliable. On several occasions he had found, on cutting into teeth which had been filled in this manner, that the pulps were dead; while in other cases they were alive. He had not seen much to give him more confidence in the process of capping with oxychloride than with anything else. The theory of capping pulps, carried out with various modifications of material, had been extensively experimented upon for many years past, but the success had never come up to the expectations raised. With this state of feeling on his part, he generally transferred operations of this character, which showed indications of possible success, to his associate, who had more faith in them than he had.

Dr. Bogue thought cutting into teeth to test their vitality mere boy's play. A spicule of ice applied to the tooth was always a satisfactory test of its condition. Where suppuration of the pulp had far advanced, he did not believe it was amenable to treatment. He kept exceedingly careful records of every case of pulp exposure treated by him, and had not lost one case of a healthy pulp, using the same means as described by the previous speakers. He had not yet learned how to arrest inflammatory action in the pulp, and would gladly receive instruction on that point from any one who was capable of imparting it.

Dr. McClelland believed erroneous views were entertained concerning the therapeutic action of the oxychloride of zinc. With a healthy pulp, its therapeutic properties amount to nothing; its only value was in its adaptability; gutta-percha would be just as useful, if it were as easy of manipulation.

Dr. Truman said that the success of this use of the oxychloride of zinc must necessarily overthrow the practice of twenty years; and he was not prepared, from anything he had seen or heard, to assert that the filling of roots was a failure. All know that the removal of the pulp is a success, just as far as amputation in surgery is a success, because it is the best thing to be done under certain circumstances. The subject had been treated vaguely by individuals, who asserted dogmatically, without producing facts in support. One asserts that there can be no failure; another admits some; while a third finds the failures to outbalance the successes. There must be a level of truth somewhere; but at this stage we can take nothing about it to be settled: it would require years of observation and experience to arrive at any positive conclusions. The theory of capping, which had been tried for years, was now an acknowledged failure. He had tried the oxychloride for two years faithfully, and believed in it. He had had failures, and

thought every one must have them. Certain conditions admit of its use. He had never yet found a pulp dead from its use; but it was impossible to tell what the result might be; and he did not believe that ill success could always be charged to malpractice. It may be that there is something in its antiseptic properties which will preserve the appearance of the tooth after the pulp is dead; but no one can tell what is its mode of operation. These questions should all be studied out at home, and we should not come here to propound theories without an array of well-digested facts to sustain them. American dentists are very far in the rear in their theoretical knowledge; as far behind the Europeans in this department as the latter are behind the Americans in practical skill.

Dr. Searle said that he had had opportunity, during the year, of examining two teeth, filled in 1862 and 1863, of which records had been kept. In that of 1863, superior second bicuspid, the pulp bled, was capped with oxychloride, and filled with gold. In 1869 that filling had been removed; the pulp was found to be living and healthy. This tooth was removed on account of neuralgia. In that of 1862, an inferior first molar, the tooth had ached; it was filled as before. The pain was intolerable for two or three hours, then ceased; there was no subsequent return of pain, nor any discoloration. This tooth had also been removed, and, on opening it, the entire pulp was found to have dried up and disappeared; there was no fetor. In other cases inflammation had followed, generally in a very few days; where it goes on for a number of days without pain, he feels no apprehension, the tooth generally dying quietly, without discoloration.

Dr. Judd said the question to be discussed is not whether the practice is always successful, but Is it judicious? We amputate limbs, and consider that practice judicious under some circumstances. Let us inquire of ourselves, Is it of any importance to preserve the dental pulp alive? Is a live tooth any better than a dead one? He believed, from experience and analogy, that a live pulp *is* better than a dead one. Philosophically considered, the nutritive processes go on at all times in teeth, in their normal condition, even in the enamel. Some think that there are no such changes; but it must be borne in mind that the enamel, dentine, and cementum are all made up of hard and soft substances; and no one will deny that all soft tissues change. Take the case of a tooth the pulp canal of which had been filled; it remained quiet for years, but the patient having an attack of measles, an abscess formed: this showed the necessity of the pulp to preserve the tooth under unfavorable circumstances. He considered it of the first importance, then, to save pulps alive; in many cases they do live under the oxychloride, and likewise die, and so also with gold. Many times teeth, the pulps of which were never uncovered, die even when filled with gold. He was not pre-

pared to say under which circumstances most dead pulps were to be found; it was certain they were to be found under both. It was always time enough to kill a pulp, but, once dead, it can never be brought to life again; it was, therefore, a judicious practice to preserve all, if possible, alive.

Pathology is a complicated and unknown subject; less is known of it than of any other in the broad domain of medicine. A few isolated facts and a vast number of theories are all that we have to show of it. The very first step, etiology, puts us at fault; we know so little definitely of the causes of disease. He was unable to give a definition of what a cell is, though Dr. Atkinson undertook to explain it. The general idea of a cell is that it is a small body with a cell-wall, fluid contents, and a nucleus; that each cell lives by itself, and has an influence on its neighbors. It is the opinion of Virchow that each cell dominates a certain territory around it. If this definition of a cell is correct, the idea that it is the ultimate anatomical element is inadmissible. It has been settled by the observations of Agassiz and Beale that there are lower elements than cells capable of performing the functions of development. The ova of turtles were innumerable, and so small that they appeared, under a magnifying power of 17,000 diameters, to be mere homogeneous particles of germinal matter, yet they were capable of true growth. We must not then accord to the cell the honor of being the germinal particle.

The most generally accepted idea of the day, as to diseases, is that they are due to microscopic animals and plants, developed in living tissues. His attention had been especially called to this subject by a paper which accidentally came into his hands from Italy; in which the author claimed the discovery of the cholera plant, in the mucous membrane of the intestines of the deceased, which he believed to be the efficient cause of Asiatic cholera. Salsbury took up a similar doctrine. Polly gives much attention to the discovery of agents to destroy these growths,—sulphurous acid being found the most deadly to them. Dr. Truman takes the same view of the origin of the green stain on the teeth; we know that this destroys the texture of the tooth, while tartar protects the structure.

It was not unusual to find a condition of very high sensibility in a part of the dentine of a tooth, and very near it a tract, almost or quite free of sensibility; and the question had often recurred to his mind how to account for it. He had made a great many sections with the purpose of determining this point; in many cases tracts were found in which the dentinal tubes were entirely obliterated, the whole structure consisting of calcified matter as far as the tract extended. In one case two entire quarters of the section were found destitute of nerve tubules, while the other portion was plentifully supplied with them. This condition afforded the most satisfactory elucidation to his mind of the ab-

sence of sensibility in some portions of a tooth, and its presence in others, showing it to depend on the nerve filaments in the dentinal tube.

Dr. McDonneld. In all modes of treatment success is variable, because the conditions are variable. He had capped teeth by different methods, and on opening them, years after, had found the pulps dead, without having shown any outward signs of change. During the past year he had capped twenty exposed pulps in the method described by the previous speakers; one of these he knew to be dead. In making the application, he found that the degree of pain was regulated by the condition of the pulp; when freshly exposed, the pain was very slight, but it was greater and longer continued in accordance with the amount of congestion. While he was a great advocate for saving teeth, he did not think that anybody could be always successful; much must depend on the condition of the patient. If the exposed pulps were healthy, not one in fifty need be destroyed; it were better to adopt the oxychloride process, and then, even if they do die, there will probably be no pain nor discoloration of the teeth. Where, from the general diseased condition of the pulp, he considers a cure impossible, he removes it; but believes more suffering is generally caused in extirpation than in applying oxychloride.

Dr. Searle inquired whether the application of either creasote or oxychloride to the pulp was not similar in effect, and whether they are compatible with it.

Dr. Atkinson said that anything which contracts the tissues is an astringent, and this is the effect of creasote; it makes a solid mass of the coagulable portion of the pulp with which it comes in contact; the excess acting as a stimulant on the capillaries until its power is exhausted. Exactly the same thing occurs with the hydrochlorate (not oxychloride) of zinc; they are similar in effect, and their mode of action is the same. Any agent which effects coagulation deprives the tissue of the power of forming globules of pus.

Dr. Buckingham. When the albumen is coagulated, will it ever become soluble again?

Dr. Atkinson. Yes and no,—dependent on the extent of the coagulation. The territory in which nutrient action takes place is always a collagenic or mucous mass, whether that be in the general juices of the flesh, or the sarcode, or in the anatomical elements denominated cells, where function is more differentially elaborated. We only know a tissue by its anatomical elements, and this difference is that which constitutes the character of the cells. In a general way, teeth may be said to be osseous tissues; but that is too crude a definition to be of service to the histologist, physiologist, or pathologist. There are three forms of hard dental tissue, known by the character of their cells, viz.: enamel,

dentine, and cementum, and they are but differences of degree of calcification, under the dominion of typal presence. The last of these is so nearly like the bone cell as to be readily mistaken for it upon superficial examination. The formation of cells is always uniform in each kind. There is no physical distinction between a cell-wall and its contents; it appears to be a homogeneous mass,—and there is no cell with fluid contents.

Dr. Judd repeated that he had seen but one instance in which two full quarters of a horizontal section were made of calcified tracts, in which the tubules were entirely obliterated, and this was a very uncommon condition, though small tracts of the same character were commonly found. Dr. Atkinson thinks that the dentinal fibrils are mere extensions of nervous matter; I believe that within the tubules are true nerve filaments. The first layers of cells forming the exterior portion of the pulp, called "germinal matter" by Beale, penetrate the tubules, forming the soft fibres of Tomes. It must be borne in mind that Beale's investigations, to which we have referred, were made long after those of Tomes, and with vastly higher powers of observation. Beale saw that the terminal point of the nerve fibre, as described by his predecessors, was really not a terminal point, but only the point where it breaks up into an infinite number of fibrils in the germinal matter of the pulp. Now, there is room in the dentinal tubules for whole plexuses of these minute fibrils, and it is reasonable to suppose that they enter the tubules in common with the germinal matter—the tubules measuring $\frac{1}{10000}$ of an inch, while these minute nerve filaments are but the $\frac{1}{100000}$. Further than this, Beale has enunciated the doctrine that there are no terminations to the nerve fibrils, but that, like the electric force, their circuit is continuous, so that there is no break in their attachment to the nervous centres. It is a principle of the Baconian philosophy that known facts are superior to theories; and he accepted the facts developed by the advance of scientific investigation as a far more satisfactory elucidation of the question of sensibility in dentine than any of the fanciful theories which have been proposed.

Dr. McQuillen said that, regarding those present as representative men, understanding scientific principles, and familiar with elementary knowledge, he should not address them as students just entering upon the consideration of such matters; but, paying a decent respect to the intelligence and acquirements of his auditory, would present what he had to offer as to those qualified to have views and opinions of their own. He differed, in some respects, from the opinions advanced by Dr. Judd in relation to the character of the dentinal fibrils. Tomes directed attention to the fact that the dentinal tubules are occupied by fibrillæ, and Beale concurred in that view; while the former was disposed to regard them as nerve fibres, neither had *asserted* them to

be such. Beale, indeed, has spoken of them as *germinal matter* from which the *formed material*, or completed tissue, is made. Dr. McQuillen has seen these fibres in examining pulps, but is disposed to think they are fluid rather than solid during life, and that their solidity under the microscope is due to a change after the removal of the tooth, like the change in the blood by coagulation. We have liquor sanguinis present in the pulp, and therefore the analogy might hold. He advanced this view suggestively, as it is impossible to demonstrate the fluidity or solidity of the contents of the tubules during life, because the structure can only be examined post-mortem. Ten years ago, in making an examination of the pulps of the incisors of the calf, he had found no well-marked connection between the pulp and the walls of the cavity in which it was lodged, except at the end of the root, where the organic basis of the dentine had been formed, with a very slight deposit of the inorganic constituents. On making a longitudinal section of the tooth, the pulp could be drawn out of the cavity without any force being exerted. Indeed, the weight of the pulp was sufficient to dislodge it when the divided tooth was held in such a position as to favor it. The connection at the end of the root, however, was invariably so firm as to require considerable force to sever it. Within the past two months, in making some injections of the pulps of calves' teeth, he had obtained similar results to those just described, and it induced him now, as formerly, to question, if the dentinal fibrillæ, which he had observed projecting from these pulps, were really extensions of the pulps, how the latter could so readily part from the walls of the pulp cavity, where it would be right to infer they were so firmly secured. Gulliver could not have been more firmly fastened to the ground when each hair of his head was tied by the Liliputians, than a pulp would be to the walls of a pulp cavity if solid fibrillæ passed directly from it into each tubule. In stating these views, he merely offered them for what they were worth, and with a full recognition of the fact that one has no right, except inferentially, to draw deductions from observations on animals and apply them to man. He would, therefore, direct attention to the ease with which the pulps of human teeth can be removed with a barbed probe; an incomprehensible operation, if the supposed connection really existed. Let any one attempt to remove the periosteum from sound bone where direct connection exists, and find the character of the adhesion.

But we are met with the inquiry, Can any other than nerve substance transmit impressions through the tooth? He could see no reason why it might not. The air transmits sound, by waves of vibration, and if one end of a long stick be placed near the ear, and the other end be scratched by a pin, the sound would be transmitted along the stick to the ear; and sensations, in a similar manner, might be transmitted through the tooth to an impressible pulp.

As to the advisability of using oxychloride of zinc, he believed in trying whether a thing was good or bad. He had tried this preparation on exposed pulps in a number of cases—in two instances in particular, which he had watched. After a month, the teeth were in a comfortable condition, and possessed evidences of vitality in color, sensation, etc. What the future results would be, time alone could reveal.

Dr. Truman said that when Tomes made his first statement in regard to nerve fibres, ten years ago, investigations had not been carried to their present degree. The method he had pursued was extremely imperfect. Beale indorses Tomes' view, but calls the tubular contents germinal matter, and proves his position by the experiment with carmine. Since Beale, Boll of Germany has written upon the same subject, in which he takes the same position as to the nerve fibres, and proves it by experiments on the rodents. In this country similar experiments had been made. He was not prepared to admit the correctness of Dr. McQuillen's position. The best method of observing these fibrils is to prepare a section of a fresh tooth, and treat it with hydrochloric acid; this will remove the animal matter, and bring out the fibres on the slide by thousands. As they present the peculiar appearance of nerve fibres, he was satisfied that they were such.

Dr. Buckingham. Is it necessary that a nerve fibre should be touched to cause sensation? It is not necessary. He favored the idea that the action in the cells is similar to the action in the galvanic battery,—the wires representing the nerves. There is great similarity between chemical and physiological action. Where does the nerve fibre terminate? There is no necessity of its going to each cell, but only in its neighborhood; and the impression may be conveyed to any part, whether in a fluid or solid state.

Dr. Shadoan said that, in case of exposure, and the pulp membrane being wounded, his practice is very much like that of those who had spoken before him, with this difference,—he applies creasote or carbolic acid until the hemorrhage has entirely ceased, then dries out the cavity thoroughly, and with a blunt-pointed instrument, of suitable size and shape, applies a single drop of collodion to the point of exposure, allowing the ether to evaporate; then, on applying the oxychloride of zinc, there is perfect protection to the nerve.

If the nerve is exposed, and not wounded, the application of the collodion will form an admirable protection from the immediate contact of the oxychloride. He found that, where this precaution was used, the pain is seldom appreciable, and often there is none at all. There is something in the manner of applying the paste. He found that the softer it is, the more pain and the less dense the mass when hard; and the harder the paste, so it is plastic enough for use, the harder it will become. There is no better way to apply it than by having all things

ready to manipulate, and, having an instrument wound with a little cotton, dip it into a very thin solution of the fluid, and mop or wipe out the surface of the cavity, and apply the paste; then gently tap the tooth, and the paste will settle nicely and uniformly to the bottom of the cavity. If the paste proves rather soft after applying it, the excess of fluid may be taken up very readily by pressing some spunk or bibulous paper upon the surface. Oxychloride of zinc is valuable in filling the pulp chambers of teeth where the roots have been filled. It makes a firm foundation for the filling, and arrests thermal shocks, which are sometimes troublesome where the gold is continuous from the crown to the apex of the root.

DENTAL CHEMISTRY.

Dr. Buckingham said, in the absence of any report from the Committee on Dental Chemistry, he had been requested to make some remarks on this subject. There had been little progress in dental chemistry during the past year, and he would, therefore, confine himself rather to a statement of the direction of inquiry among investigators in the department of chemical science. He considered it to be a subject of most serious regret that this science, which lay at the foundation of all others, was so universally neglected by the community. The ignorance upon this subject was most deplorable. How many students or learned men could tell the constituents of the air they breathe, the water they drink, or the bread they eat! Not one in five hundred of them could tell how many elements there are; so that professors are obliged to teach the A B C of the science, instead of finding students ready to be instructed in the higher branches. As in reading, it is necessary, first, to master the letters and their capabilities of combination, so it is in chemistry. The elements, sixty-five to seventy in number, with their equivalents and atomic weights, are the alphabet of the science from which all chemical combinations arise; the properties of the individual element being lost in the combination, just as in words the essential part is not found in the separate letters, but in the thought suggested by the whole.

The investigations of the present are directed, not to matter so much as to the forces which control matter. The great question is whether there is one force or many. Whether heat, electricity, motion, etc. are several forces, or phases of one force. Motion produces sound, which is conveyed to the ear—hence, hearing; a faster motion produces heat; another motion produces light, the varieties of color being due to the different degrees of rapidity of the motion. These views have not been demonstrated, but the current of opinion is in favor of their correctness. The whole universe is in continual motion; harmonious motion is necessary to nutrition and health, and the disturbance of that harmony produces pain; thus extreme heat or cold produces the same

effect. While the elements cannot be changed, their combinations are illimitable; and living bodies are continually nourished by appropriating from these combinations, in the form of food, that which they require, passing off the refuse in lower states of combination. The speaker dwelt at some length on the important part chemistry performs in the physiology of life, and concluded by animadverting upon the skeptical tendencies of many modern scientific investigators, such as Darwin, Spencer, and others, whose disposition seemed to be to set up some great natural force as the origin of all life and motion, whereas he believed all life-force to be subordinate to spirit-force, proceeding from the Almighty Creator.

Dr. Judd said it was true more attention was being paid to the affections of matter than to matter itself. Although matter may be ignored in the study of the forces, it is nevertheless indispensable to their operation. It is impossible to have any notion of motion apart from matter. He proceeded to state the views of Tyndale and Grove on this subject, with the latter of whom he expressed his agreement.

Dr. Buckingham. We cannot understand the existence of a force without matter; neither can we conceive of motion without something to move. Hence scientific men invented the idea of an ether, which should be the medium of conveying the idea of motion. The consideration of the origin of forces occasions the continual recurrence of the question, Are there many forces, or is there but one acting in different ways? When matter was made, the laws controlling it were made, and they must continue to the end of time. Man has no conception of sensation apart from matter, nor of the manner in which he reasons.

Dr. McQuillen congratulated the Association on the fact, that although the Committee on Physiology had failed to make a report, the one on Chemistry supplied the deficiency by the introduction of such important questions as the Correlation of Forces and the Origin of Species. In the discussion of such subjects, they should be examined in the calm, dispassionate manner in which other purely scientific themes would be considered. Above all, it should be recognized that the right to seek after the truth, even though it should lead to a conflict with long-cherished opinions, is the highest prerogative of man. As Herbert Spencer has justly said,* "Early ideas are not usually true ideas. Undeveloped intellect, be it that of an individual or that of the race, forms conclusions which require to be revised and re-revised, before they reach a tolerable correspondence with realities. Were it otherwise, there would be no discovery, no increase of intelligence. What we call the progress of knowledge is the bringing of thoughts into harmony with things, and it

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* Although not quoted *verbatim* in the discussion, in justice to the subject and to Mr. Spencer, his exact language is presented in the report.—J. H. McQ.

implies that the first thoughts are either wholly out of harmony with things, or in very incomplete harmony with them.

"If illustrations be needed, the history of every science furnishes them. The primitive notions of mankind as to the structure of the heavens were wrong; and the notions which replaced them were successively less wrong. The original belief respecting the form of the earth was wrong; and this wrong belief survived through the first civilizations. The earliest ideas that have come down to us concerning the natures of the elements were wrong; and only in quite recent times has the composition of matter in its various forms been better understood. The interpretation of mechanical facts, of meteorological facts, of physiological facts, were at first wrong In all these cases men set out with beliefs, which, if not absolutely false, contained but small amounts of truth, disguised by immense amounts of error.

"Hence the hypothesis that living beings resulted from special creations, being a primitive hypothesis, is probably an untrue hypothesis. If the interpretations of nature given by aboriginal men were erroneous in other directions, they were most likely erroneous in this direction. It would be strange if, while these aboriginal men failed to reach the truth in so many cases where it is comparatively conspicuous, they yet reached the truth in cases where it is comparatively hidden."

That mystery of mysteries, the origin of species, is occupying the undivided attention of some of the keenest and clearest intellects in the world. Darwin, in particular, a devoted student of nature, after years of labor spent in accumulating an immense mass of facts, has drawn certain inferences, which are entitled to a candid, careful examination before being rejected as unfounded and worthless. A significant fact, but not by any means a surprising one, is that most of those who oppose or denounce his views, have never read his works, and therefore knew nothing of the facts and arguments presented in them. Thus is it ever with innovators and innovations. In the language of Professor Agassiz, "Whenever a new and startling fact is brought to light in science, people first say, 'It is not true,' then that 'it is contrary to religion;' and, lastly, that everybody knew it before.'"

The time is too limited to present even a faint synopsis of the Evolution theory, but it may not be amiss to say, in a few words, that Darwin has not attempted to solve the question of the origination of living or organic beings, but, supposing their creation to have taken place at first in the lowest forms, he accounts for the origin of species through the perpetuation and modification of the original types. First, by the possession of a peculiar property, which he calls Atavism, from *Atavus*, ancestor, living beings inherit the character of those from whom they arise. Second, there is also manifested a tendency to variability, due to the influence of the surrounding conditions of existence; and an

alteration having occurred in certain beings, it would be transmitted to their descendants. In the lapse of geological ages, the combined operation of these tendencies to the transmission of hereditary properties, and of occasional variability, due to the changing conditions of existence, combined with the struggle for existence between individuals of different species (in which those possessing the greater facilities for obtaining food, or of resisting external destructive agencies, would survive and multiply, while those less fortunate would gradually die out), Darwin believes may account for the infinite variety of species extinct and present.

In presenting these views, I do not wish to be understood as asserting, beyond a question of doubt, that they are true ; but that, after spending a number of years in examining the facts and arguments offered, the conclusions arrived at appear to me reasonable and logical inferences. It is sincerely to be hoped that those present may become thoroughly familiar with the writings of Herbert Spencer, Darwin, Huxley, and Lyell, particularly before denouncing or rejecting the views advanced by them as unfounded and worthless. In this restless, inquiring age it is useless to attempt to silence the outspoken words of earnest investigators by the mere dogmas of the past. On the contrary, we should hold ourselves ready to examine and receive new truths, and to abandon erroneous opinions, when convinced of their fallacy. In this connection, I am free to admit that the sharply-defined boundaries between inorganic and organic matter, and the vegetable and animal kingdoms, contended for in the past, have lost much of their significance to my mind, when viewed by the light of recent investigations and reflection.

The constant interchange between inorganic and organic matter, the dependence of the vegetable upon the mineral, and of the animal upon the vegetable, as a factor of organic matter ; and the return of the elements entering into the composition of the vegetable and the animal to the source from whence they came, to be similarly used again and again, for all time to come, by other beings, tended to lessen the gap between the inorganic and organic, the vegetable and the animal, and leads to the recognition of the fact that "Nature is a unity in diversity of phenomena ; a harmony blending together all created things, however dissimilar in form and attributes ; one great whole animated by the breath of life."

Dr. Buckingham said that, according to the materialistic doctrine, all animals were developed by continuous progression, from the primary cell through all the lower genera and species up to man, and they look for the development of a being of a still higher order. All things, according to them, were derived from combination, without the intervention of any supreme power ; as if there were nothing superior to the types or letters composing any printed matter. Even as the letters are of themselves expressionless, dependent entirely upon the thought

breathed into their combinations, so the forms of nature are dependent upon the supreme mind for their principle of life. The tissues have been counterfeited in all respects, except that vitality cannot be imparted to them. The materialists make no calculation upon a future existence; all their theories are limited to the development of the highest order of natural existence; beyond this they know nothing and admit nothing.

Dr. McQuillen said that Herbert Spencer has divided his "First Principles" into the unknowable and the laws of the knowable; under the first defining the province, limits, and relations of religion and science; and under the second unfolding those fundamental principles that have been arrived at within the sphere of the knowable; which are true of orders of phenomena, and constitute the foundation of all philosophy; and maintaining the law of evolution to be universal in its operations.

In the discussion of all scientific subjects, and particularly those under consideration, it would be well to recognize this distinction, and not confound the unknowable with the knowable, but to confine attention to the latter alone. I cannot, however, in justice to myself and others, permit the imputation of the denial of a Supreme Being and of a future existence to pass unnoticed, as it is a gratuitous and unfounded assumption. The theory of the origin of species by variation or evolution does not imply the denial of a Creator; on the contrary, it attributes everything to the operation of immutable and unchangeable laws; nothing to the work of chance. The testimony presented by the rocks affords substantial evidence that there has been a gradual and progressive evolution or development from the lower to the higher forms of life. Thus, in the Silurian, the lowest of the Palæozoic rocks, the remains of invertebrates alone are found; following these, vertebrates (fishes) first appear in the Devonian; then come, in varying intervals of time, reptiles, birds, mammals, and, last of all, man.

The contemplation of such a humble origin in the past naturally leads to the anticipation of a still higher and nobler development in the future. Is there anything humiliating in the recognition of the fact that the life of man is dependent upon the continued destruction and consumption of plants and animals which enter into and become part and parcel of his organism? It has been estimated that a man, weighing one hundred and fifty pounds, in the course of a year consumes a ton and a half of inorganic and organic matter,—in the air he breathes, the water he drinks, and the vegetables and animals he feeds upon,—and yet, at the end of the year, he weighs the same. What has become of all this matter which, like a continuous stream, has flowed through him, and maintained his form, apparently unchanged? It has returned to the source from whence it came, to be again used through all time. The inorganic matter of to-day may become organic matter to-morrow, to be again reduced, perchance, to inorganic matter on the following day.

Man dies daily, and lives by dying. If the matter upon which his entire system depends is thus daily returned to nature, it naturally follows that in the final dissolution of the body, its component parts must be resolved into the elements to enter into new combinations.

To those who cannot deny these truths, but may cry out Materialism! in response to such statements, I would say that I never hear that sublime Epistle of Paul to the Corinthians, which is used on the most solemn occasions, connected with the dissolution of earthly ties, without being impressed with the learning and far-reaching philosophy of the great apostle, who there teaches, what many of his professed followers are so slow to learn, concerning the resurrection, that it is not the natural body, which is corruptible, but a spiritual and incorruptible body which is raised,—"So also is the resurrection of the dead. It is sown in corruption; it is raised in incorruption." "It is sown a natural body; it is raised a spiritual body."

Dr. Atkinson said it is well enough to define species, but it has not yet been done; when that has been attended to, it will be time enough to define the origin of species. Chemistry is the lowest manifestation of organic force, and the expression of the physiology and pathology of the mineral kingdom. Atheism is insanity; under the Divine government it is not possible that a being possessed of human intelligence can be an atheist. Nothing can be appropriated without being disrupted from its former position. The whole idea of assimilation is indicative of the destructive and constructive processes, without which the system cannot be sustained. Each form must be destroyed as to its identity before it can be appropriated, and each process has a chemical, mechanical, and dynamic aspect, without a knowledge of which its understanding is incomplete, and the process of nutrition an enigma to us.

OPERATIVE DENTISTRY.

Dr. Corydon Palmer presented enlarged drawings of the superior and inferior dental arches, representing the ridges, cusps, pits, and fissures in the teeth, all of which were scientifically designated. He said each of the teeth followed a certain type, which is invariable; and the object of these drawings was to point out the probable lines of decay, and the necessary reparative treatment. The drawings were followed by plaster models; the first, a cast from an impression of a particular mouth as it was, indicating the points of decay; next, a similar cast, showing the cavities as prepared for filling; and a third cast, with the operations completed. A number of large and beautifully executed plaster models were then exhibited, showing similar operations on a larger scale, and exemplifying his manner of wedging. He prefers locust wedges, because they neither absorb moisture nor slip; of these he uses three, one at the cutting edge or summit of the tooth, to be used first, and the

space thus obtained to be secured by a wedge driven at the neck, and also a thin wedge to protect the gum. In driving wedges at the cutting edges of incisors, they should be set perpendicularly instead of horizontally, to guard against fracture of frail teeth. To protect from moisture, it was of great service to introduce a wedge from within the arch in addition to the one from without. Attention being called to the accuracy of the casts, it was stated that the impressions were taken in gutta-percha, which was allowed to harden slightly before removal from the mouth. In answer to a question, whether any of the pulps were exposed, and, if so, how treated, it was replied, that there was one exposed pulp, which was treated with carbolic acid, capped with Hill's stopping, and filled with gold; as far as could be judged, the treatment was successful.

Dr. Jesse Perkins at this point presented a case of loss of the inferior maxilla from phosphor-necrosis, with consequent retraction of the soft parts. Drs. Atkinson and Taft were requested to examine the case. They reported that the whole of the lower jaw was lost, and that an artificial appliance could only be made available by very gradual steps.

Dr. Allport gave some particulars of a surgical operation, where the bone forming the chin being removed, and the cut extremities approximating, he distended the parts gradually to their normal position by mechanical appliances, and then introduced a permanent artificial substitute.

Dr. Atkinson said it was happy for the dental surgeon that the territory with which he had to do was so capable of being interfered with; and the rule to be observed, wherever imperfection exists, is to cut down with chisel and file to a healthy basis, saturate with creasote, and restore the exact contour of the lost or undeveloped parts. In ninety-nine per cent. of children's six-year molars there will be work to do. When a patient is presented, the first requirement is a correct diagnosis and a clear statement of the case, which should be given without regard to the chances of losing the operation. An imperfect diagnosis insures imperfect work. Cleaning the teeth is a matter of the first importance; if they are well developed and sound, see that the ligaments around them are all right, and carefully remove every particle of foreign matter deposited upon the necks and roots.

Question. When would you extract a tooth?

Dr. Atkinson. When I would bury a man,—when he is dead. The tooth is not dead when the pulp is dead, nor when it is extirpated, for the cement continues to receive pabulum through the periosteum until the connection is entirely separated. This indicates the position we should assume. He wondered that people had not anathematized the dental profession for all they had suffered from it; and but for hope of better things, which is always springing up in the human breast, we should all have been given over to nitrous oxide and the forceps. After finding

the mischief, the next thing is to overcome it; and to do this use No. 20 foil, and a lead mallet of six to eight ounces; with these the work can be done easily.

Question. Can you save every case where the pulp is dead, or where there is a discharge from the socket of the tooth?

Dr. Atkinson. Yes, within my limits. A man is not dead until he is resolved back into his ultimates. Wherever there is a discharge, be sure there is life, which is trying to get rid of the diseased condition. The discharge of matter from the gums is due chiefly to the mode of brushing them, *from* the teeth, which spoils their attachment. In such a case remove all foreign matter from the root, be it more or less, and inject carefully, with a hypodermic syringe, a drop or two of the solution of the chloride of zinc, of the strength of 480 grains to the ounce of water, sufficient only to bathe all the parts where it is desirable to obtain an attachment; thus a coagulated substance from the juices of the flesh is obtained, and the attachment will in time be secured. Failure, after such treatment, may be set down as the result of an imperfect performance.

Dr. Wetherbee. Is an extracted tooth dead?

Dr. Atkinson. The pulp is dead very soon, but the dentine, from its analogy to the vegetable kingdom, requires a longer period, while the enamel is only killed by chemical solution.

Dr. Wetherbee. Should not those who extract teeth, then, be indicted?

Dr. Atkinson. "Let him who is without sin cast the first stone."

Dr. Wetherbee. We want to cease using the term "fang;" it is used by medical writers, but they are no authority for us. When a tooth has lost its attachments, is it alive?

Dr. Atkinson. So far as it is attached.

Dr. Wetherbee. Then, when it is nine-tenths detached, is it nine-tenths dead?

Dr. Atkinson. No.

Dr. Wetherbee proceeded to say that when the soft solids are devitalized, and the attachments lost, the tooth is dead. Total calcification is death. He objected to Dr. Palmer's preparation of cavities in the first superior molars; he considered the transverse ridge a weak point, which should be cut away; he also objected to there being two cavities made in the posterior part of the tooth,—durability should be the only consideration. In the bicuspids, where there were two depressions and a fissure, he would cut from the posterior cavity forward to the anterior fissure.

Dr. Palmer explained that the cavities were done in both ways, according to the indications.

Dr. Crouse said that, after treating alveolar abscess, he thinks it best to use a temporary filling instead of inserting gold at once. He objected to quick wedging as unnecessarily painful; wedges of pine wood, used

gradually, were much more desirable; a member present had his central incisors permanently separated by quick wedging. He was also opposed to the method of filling bicuspids so that they would come in contact after the removal of the wedges; this, in his opinion, would insure fresh decay. He disliked the angles in the cavities as prepared by Dr. Palmer in his models; he considered them much more difficult of filling, and insecure when filled, than if the points left projecting into the main fissure had been cut away. He also objected to the use of such heavy foil as No. 14, 15, or 20; he would prefer No. 2, 3, or 4. He thought it not best to attempt to confine any one to one kind of foil any more than to one kind of instrument. He believed in not having foil too adhesive, and in using soft foil over the edges of enamel, with hand-pressure or with the mallet. In retaining points he would use a piece of gold partially annealed.

Dr. Wetherbee said wedges were safe in skillful hands; they might be severe, but not half so severe as the use of rubber; the soreness caused by the rubber was ten times a greater objection to its use than that of the wedge. All the separation necessary, even in the smallest cavities between the front teeth, is such as to allow the passage of the thinnest file; with properly formed instruments he obtained any more room which he needed from the palatal surface. Comparing his practice of twenty years ago with that of to-day, he was sure that there was less suffering from the quick wedge than from the rubber.

Dr. Thomas was opposed to quick wedging from personal experience; he had been made to suffer more in that way than he would ever inflict upon one of his patients. Next to the wedge of hard wood driven quickly, came rubber; he was opposed to that also; it is fearfully expansive. He needs more room for operating than would merely allow the passage of a thin file, and to secure this with the least possible pain to the patient, he uses cotton, which in a little time secures ample space. He narrated an instance of heroic wedging, which occurred in a certain dental society, which resulted in splitting off the lateral incisor.

Dr. Woolworth rose to say that he agreed fully with the views of the last speaker.

Dr. McDonneld announced himself as a champion of quick wedging; he had never split the alveolus nor done any other damage; but admitting such things to have happened, they were no more an argument against wedging than similar occurrences in extracting; all his experience was opposed to slow wedging. He considered contour fillings indispensable, and covered all exposed dentine and parts of enamel that had been cut with gold. He did not like the file for cutting out fissures; never used it except for cutting away enamel that should not be left.

Dr. Morgan assumed that enamel is a living tissue, and as a portion of it is composed of animal matter, it must be subject to wear and re-

placement in common with the osseous tissues. That this is so, appears from the fact that enamel deprived of its subjacent dentine ultimately breaks down from lack of nutrition, though this result may be very slow of attainment. It was very necessary to pay proper attention to children's temporary teeth; in the sixth-year molars, in adults, he found about one in forty that needed no operations. Cleansing teeth was another matter that could not be too carefully attended to; he thought he had never thoroughly cleansed a bad set of teeth in his life, and he had never seen it done by any one else. He would add his testimony that the vitality of a tooth is never lost as long as there is any adhesion of the periosteum; when entirely dead, nature throws it off. He could not agree with a former speaker that the transverse ridge should always be cut out; there were cases where this should be done, but it was by no means the rule; on the contrary, the rule should be to cut as far as the decay reached, but not a hair's breadth farther. It was desirable to retain as much of the solid substance of the tooth as possible; but if a part was burrowed under, or there was doubt of its strength, it should be cut away. It had been assumed that in bicuspids all the fissures should be cut out; this might be necessary in many cases, but he thought it wrong where the cusps are short and the enamel strong; he protested against the idea that gold is better than sound tooth substance. The proposition to cut away the sides of the cusps to correspond with the size of the neck would ruin the teeth in many cases; it is only admissible so far as may be necessary to cover the exposed dentine. He did not think it practicable to cover the edge of enamel at the cervical wall of the tooth, if beveled; there would always be sufficient leakage between the enamel and dentine to destroy the latter.

Dr. Palmer said that a retaining pit was, of all others, the place where adhesive foil should be used; he did not round the corners of the enamel; he wanted them as square as he could get them.

Dr. Wetherbee opposed beveling; he removes the feather edge of the enamel with a watchmaker's file. He objected to preparing cavities by following out all the fissures; it was but once in fifty times that this is necessary. He would rather cut off the angles, throwing the cavity into one; nothing is gained by leaving these ridges; the tooth is stronger without than with them. The operation should always be done in the best manner, irrespective of other considerations.

Dr. Crouse would agree with Dr. Wetherbee as to the manner of opening cavities, but not on wedging; quick wedging is a heroic kind of practice, and dangerous. He denied cutting away the bicuspids in the manner charged; he would cut sufficiently to preserve a proper space between the teeth to keep them clean. Filling fine retaining points is about the most difficult part of an operation. He maintained his views in regard to soft foil, and predicted a greater use of it than ever.

Dr. Mills pursues quick wedging as a means of saving his patients from more painful operations. He agreed in removing the feather edge from enamel by using a fine file. Cleaning teeth was a subject of the greatest importance, and one to which he had devoted his best efforts; very few, he was persuaded, had any adequate idea of what was meant by the expression; it was not merely to take away the portions of tartar that might be conveniently reached, but to remove every particle of foreign substance on any part of the tooth.

Dr. McQuillen said: My experience as a teacher has convinced me that students can be taught in a few months to fill a tooth in a highly creditable and skillful manner. It is not enough, however, to know How to do! but What to do! and When to do! This implies a thorough knowledge of the cause of trouble; and it demands a devotion of years to acquire that thorough knowledge of the principles and practice of the profession, combined with the constant and daily application of these, which can enable a practitioner to diagnose promptly and correctly the varied and complicated cases occurring in practice, or upon which the medical man may desire an opinion in consultation. Even with the most careful training, few manifest this faculty in a high degree; apparently only those who have been endowed by nature with peculiar gifts, like the divine afflatus of the poet. What is it in the justly eminent physician, surgeon, or dentist which secures the confidence and respect alike of the community and the profession? Is it the fertility and inexhaustible resources manifested by the physician in his prescriptions, or the facility with which the surgeon amputates a limb or extirpates a tumor, or the dexterity and skill displayed by the dentist in the performance of his operations? These qualities are frequently manifested by men who make but a slight impression on the world; but when they are combined with the possession of diagnostic powers of a high order, a master-mind is recognized and respected as such. While few can occupy such an elevated field of usefulness, all should endeavor to develop to the fullest extent the perceptive and reasoning faculties which have been granted to them, for it is through the constant exercise of these that the ability to diagnose correctly depends. In applying these principles to the practice of dentistry, reference was made to the necessity of employing the finest probes (possessing flexibility and toughness) in the examination of the teeth, so as to discover those minute openings in the enamel which frequently lead into cavities of the largest size. The prevalence of symmetrical disease in the teeth, and the more than probable supposition that when a tooth was found decayed on one side the corresponding one of the opposite side would prove to be in the same condition, was dwelt upon as a matter of decided moment to bear in remembrance.

Dr. Butler spoke of the care necessary in examining cases; it can

only be properly done with fine probes, and silk thread, and wedges. It is proper and necessary that a fee should be charged for such examinations, as is the custom among physicians. As remarked by a previous speaker, it is impossible that the result of a defective diagnosis can be otherwise than unsatisfactory.

DENTAL HISTOLOGY.

Dr. McQuillen said that, as Chairman of the Committee on Dental Histology, he had no written report to offer, but in place of one would make a verbal statement of some of the work which had recently engaged his attention—the injection of the pulps of calves' teeth, a number of preparations of which he had brought with him, and would exhibit to the members under the microscope. The subject was one which he had been compelled to work out for himself, as he could not find any account, in the works which he had access to, of the method to be pursued, except such as applied to other organs,—the liver, kidneys, etc. Having made an injection of a kidney, and mounted microscopical sections of it, which had been well thought of by several professional friends, he concluded to try a new field, in which, after a number of unsuccessful efforts, he had obtained the results which would be shown, as follows: procuring a calf's head at the market-house, the external carotid artery (which gives off a branch, the internal maxillary, supplying the teeth with blood-vessels) was sought for and found, after some trouble, owing to the contraction and retraction of the muscular coat of the artery, burying it in the surrounding soft parts; the detached nozzle of the injecting pipe was then introduced into the mouth of the artery and securely tied around it, and the calf's head placed in a pan of warm water, not so full as to cover the nozzle of the syringe, and just hot enough to bear the hand of the operator without discomfort. In the mean time a bottle containing Dr. Carter's carmine injecting fluid had been placed in water of the same temperature, and the syringe treated in the same manner. After the head had been in the water about ten minutes the syringe was filled with the coloring fluid, and the latter slowly and gradually injected into the vessels, great care being exercised not to allow any air to be in the nozzle of the syringe, as this would be forced into the vessels, and prevent the injection. On completing the injection, the head was removed from the water and set away in a cool place for an hour or so, when the incisors and some of the molars were extracted with ordinary forceps, and the teeth split open so as to expose the pulps. The latter were only found adherent to the walls of the pulp cavity at the extremity of the roots, where the process of growth was progressing most rapidly. At this point the adhesion was so firm as to require considerable force to sever

the connection. The pulps were then placed in a preservative fluid, composed of Bower's glycerin, one ounce, strong acetic acid, five drops, and allowed to remain in it for a few days, when they were mounted in glycerin jelly on glass slides, the thin glass cover being secured by a ring of white cement around the edges. The results obtained would be seen under the microscope to present a rich plexus of minute vessels branching off from a number of larger ones, and these again being derived from the main artery of the pulp. In addition to this, projecting from the sides of the pulp, would be observed the dentinal fibrils of Tomes.

In bringing this subject before the Association, the speaker said it was merely introductory to a series of investigations which he proposed to enter upon in relation to the histology of the dental pulp in the three stages of dentition—follicular, saccular, and eruptive. The observations of Goodsir were of incalculable value in this direction, but it should be remembered that his work was accomplished without the aid of the microscope, and the employment of that instrument would no doubt reveal some new facts in this interesting field; and although something had been done by European microscopists, there yet remained ample room and verge enough for others.

Attention was directed to the obligations resting upon dental practitioners to do their part in contributing to science, and thus relieve the profession in America from the well-founded charge of being dependent upon European investigators for their knowledge of dental histology. The advantages and opportunities enjoyed by European investigators were contrasted with the difficulties surrounding such efforts in America; yet it was contended that there was no reason why rich results should not be obtained here, by those who would devote themselves untiringly to scientific investigations. The only way to gain knowledge, in new and unexplored fields, is to keep trying; even though blundering ever and anon. Persistence in such efforts frequently yields results gratifying to the investigator, surprising to the world, and constituting a valuable addition to the annals of science.

In addition to the specimens of pulps, he exhibited some sections of an injected sheep's kidney, showing the Malpighian corpuscles; also a number of preparations made within the last six months illustrative of that terrible disease, trichiniasis, which is either more generally recognized or fearfully on the increase in America. The former supposition was the most probable, and many cases of death, with the cause shrouded in obscurity, have been doubtless due to the presence of these horrible parasites. The specimens were: No. 1. A woman who died in the Philadelphia Hospital last winter; showing the trichina inclosed in cysts. No. 2. A young girl who died in Clay City, Illinois, with the trichina very numerous, unencysted, and in migratory condition. No. 3. A woman

who died in Elgin, Ill., with the trichina very numerous and coiled up, apparently preparatory to becoming encysted. Judging from the presence of large quantities of oil globules, the muscular tissue had apparently undergone fatty degeneration. No. 4. A portion of pork containing trichina eaten by the person from whom the preceding specimen had been taken. The trichina, although not very abundant in the pork, were well marked. As a series of specimens, these preparations were very valuable, particularly for educational purposes, in showing the parasite in various conditions, and in the fact that the last two specimens bore the relation of cause and effect, in the development of the disease of which the person died.

Dr. Atkinson said the European scientists were so near to one another that they had to confine themselves to a single tissue in order to avoid collisions; and they spent a whole lifetime in following up one train of investigation. It is the prevailing habit of Americans to spread their investigations over so large a field as to be necessarily superficial; and therefore foreign opinion could not be very complimentary to the Yankees. He was not distressed because they would not receive experiments by us as conclusive. He had been largely occupied of late with experiments in the development of the hen's egg into the chick, by which he had been fully convinced that the only difference between the white and the red corpuscle is in the coloring material, which is formed in the egg before either the corpuscles or the vessels. The young corpuscles are arranged in tracts, without walls; simple germinal matter, which the best powers of the microscope cannot reduce into individual bodies; mere flocculent masses originating on the border of the yelk. The blood corpuscles are seed bodies from which all tissues arise; the origin of any planetary body cannot be presented to the physical sense, but only to the intellect. In our present condition our minds are divided just as the molecules are when they become sick. Irritation is the first disturbance of nutrient action; aberrant nutrient action may be spent or neutralized, or compromised and further sickened. White corpuscles are designed for the formation of white tissues, and are the embryos of the red corpuscles, whose mission is the formation of red tissues and the conveyance of oxygen to the various cell territories. He thanked God for the invention of the microscope; its revealments are the platform on which all operations on the human body should be based. Histogeny is the alphabet of all medical science, and without it there can be only bungling spelling.

Dr. Judd said there was a great deal more of danger from the trichina disease than was generally supposed. He had examined, under the microscope, specimens from six subjects which lay side by side in the dissecting-room last winter, without any reference to the disease by which they had died, and of these six he found trichina in three. He

believed many deaths occurred from trichina which were set down to other diseases.

It is a common idea with histologists that there is no difference between one cell and another, that of an elephant, or of an oak, for example, or between the ovum of an elephant and the ovum of man; yet there is a vast difference, which might be denominated *potentiality*, or the power by which one was formed into an elephant and the other man. According to one theory, the difference is developed by circumstances; he believed that the cell of an elephant contained the potentiality of an elephant. In his own observations of cells, they showed regular and persistent currents, as distinct as those of the Gulf Stream; these currents being alike in similar species, but different in others, so that he had hope, by simple examination of a cell, to discover its potentiality. Similar observations have been made by distinguished Russian scientists.

Dr. McQuillen. The reproduction of organic beings is effected by one of two methods,—the *asexual* or the *sexual*. Illustrations of the first are presented in the "budding" of plants, and in the lower forms of animal life, as the polypus, for instance. These "buddings" becoming detached constitute new beings. Sexual reproduction, on the other hand, implies male and female parents, the first furnishing the spermatozoa, and the last the ovum, or egg, among animals; while in the vegetable kingdom, the first supply the pollen-grain, or antherozoid, and the last the ovule or seed. The direct union of the spermatozoa and the ovum is indispensable to the development of a new being, neither of them alone having the power of assuming the form of the parent. When examined under the microscope, the ovum of one animal resembles so closely the ova of other animals that it is impossible to distinguish any difference between them; yet that there is a specific tendency for each to grow in the resemblance of its parents, no one would pretend to deny; and in applying the term *Atavism* to this property, it conveys the same idea as *potentiality*, for it means the tendency of like to produce like. It should be remembered, however, that in addition to this, there is also a tendency to *variation*, by which the offspring, although resembling their parents in many particulars, yet differ from them in other respects; and that in some instances the difference is so great as to destroy all resemblance. This tendency to *variation* may not produce important modifications of form in all the living beings under the observation of man, in the limited period granted him to make his investigations, but in the lapse of ages, and with changing *conditions of existence*, it may be attended by alterations of the most important and wonderful character in the *progressive development of species*.

It is natural that the majority of those who had been taught to

regard the origin of species as taking place by special creations, and who esteem it as an article of faith, should oppose such views, as it is but a repetition of the experience of the past in the progress of science. Men generally cling firmly and fondly to old and cherished opinions; and there is such a tendency to fossilization, on the part of the old and middle-aged, that but for the efforts and support of independent thinkers, and the fact that the plastic minds of the young are ever ready to receive new truths, there would be no advancement in science, the arts, or in letters. Society, ever and anon, grows too large for its old clothes or ideas. The serpent, the lobster, the crab, indeed all animals, man not even excepted, are constantly throwing off the old integuments, some slowly and gradually, scale by scale, while others cast the skin or shell entire, when no longer serving a useful purpose. Martin Luther and his confrères, theological and scientific, succeeded in bursting through and casting a pretty large, thick, and tough skin in the Reformation; men of science are engaged upon one in the present age, quite as difficult to rend; and, as Prof. Huxley remarks, "every good citizen must feel bound to facilitate the process, and, even if he have nothing but a scalpel to work withal, to ease the cracking integument to the best of his ability;" or, as one might add, increase the gap with the investigations and revelations of the microscope.

It is a source of congratulation, as an evidence of growing liberality, that such subjects can be discussed without that manifestation of bitter opposition and feeling, and an indulgence in personalities, too often evoked. If those who favor the theory of the *progressive development of species* are in error, the best way to convince them of their mistake is by calm, dispassionate argument, and the presentation of incontrovertible evidence, rather than to denounce them for entertaining views which they may have erred in accepting, but yet honestly infer to be at least reasonable suppositions, if not fully proven.

AMERICAN DENTAL CONVENTION.

THE fifteenth annual meeting of the American Dental Convention will be held at New Haven, Conn., commencing Thursday, October 21st, 1869, at eleven o'clock A.M.

OFFICERS.

President—Dr. J. M. Crowell, of New York.

Vice-President—Dr. J. A. McClelland, Louisville, Ky.

Recording and Corresponding Secretary—Dr. J. S. Latimer, New York.

Treasurer—Dr. J. H. Smith, New Haven.

ORDER OF BUSINESS.

1st. Reading the minutes of the last Convention.

2d. Admission of members.

3d. Report of Officers and Committees.

4th. Election of Officers.

5th. Retiring President's address.

6th. Induction of officers elect.

7th. Miscellaneous business.

All essays shall be read to open the discussions on the subject to which they relate.

No member shall speak more than fifteen minutes, nor more than twice on the same subject, without permission.

SUBJECTS FOR DISCUSSION.

1st. Conservative dentistry.

2d. The best protection for exposed nerves.

3d. Inflammatory diseases of the gums and periosteum, producing absorption of the sockets and loosening of the teeth; causes and treatment.

4th. Contour fillings.

5th. The best materials as a base for artificial dentures.

6th. Miscellaneous subjects.

EXECUTIVE COMMITTEE.

Dr. J. H. Smith, New Haven, Conn.; Dr. W. H. Atkinson, New York; Dr. W. B. Hurd, Brooklyn, N. Y.; Dr. J. C. Robbins, Jersey City, N. J.

N. B.—The Executive Committee suggest that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and to the disposal of business not embraced in the regular order.

MAINE DENTAL SOCIETY.

The fourth annual meeting of the Maine Dental Society was held in Winthrop, August 18th and 19th, Dr. A. K. Gilmore in the chair. The Society made choice of the following officers for the ensuing year:

President—Thos. Haley, D.M.D., Biddeford.

Vice-President—Thos. Fillebrown, D.M.D., Lewiston.

Corresponding and Recording Secretary—E. J. Roberts, D.D.S., Vassalboro.

Treasurer—J. B. Fillebrown, Winthrop.

Librarian—J. Snell, Augusta.

Executive Committee—Wm. Randall, M.D., E. Bacon, M.D., A. K. Gilmore, G. W. Reed, and J. Snell.

The report of the Committee on Dental Legislation was accepted and discussed. It was voted unanimously to lay the matter before the Legislature the coming winter, and urge the passage of a bill properly regulating the practice of dentistry in this State. A new committee was chosen for that purpose. To secure united effort, it was voted to meet at the call of the Committee for the next semi-annual meeting at Augusta. It was decided to hold the next annual meeting at Biddeford.

Dr. Thos. Haley then read an interesting and instructive paper on the discovery, properties, and medical use of carbolic acid, and his method of application. The subject was discussed by Drs. J. B. Fillebrown, I. A. Salmon, and others.

A clinic occupying two hours was held by Dr. I. A. Salmon, of Boston.

For clinics at the next semi-annual, Drs. Thos. Haley and A. K. Gilmore were chosen, Dr. Wm. Randall to prepare an essay on chloride of zinc, Dr. Thos. Fillebrown, an essay on anæsthetics.

After adjournment, the Society engaged in a pleasure trip down the Annabescook Lake ; and in the evening partook of a collation given at the residence of Dr. J. B. Fillebrown.

E. J. Roberts, *Secretary.*

TEXAS DENTAL ASSOCIATION.

Pursuant to a call issued several weeks previously, a meeting of the members of the dental profession was held at Houston, Texas, on Wednesday, 16th of June, and proceeded to organize a State Dental Association, to represent and advance the interests of the profession in the State. Several counties were represented. After the adoption of a Constitution and By-Laws, the following officers were chosen for the ensuing year :

President—Dr. M. M. Michau.

Vice-President—Dr. Edmundson.

Corresponding Secretary—Dr. P. T. Clark.

Recording Secretary—Dr. T. Robinson.

Treasurer—Dr. H. G. McNeil.

Librarian—Dr. J. D. Collier.

Adjourned to meet in Houston on the 2d Wednesday in June, 1870.

Thomas Robinson, *Secretary.*

BIBLIOGRAPHICAL.

BOOKS AND MAGAZINES RECEIVED.

A Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts. By Jas. E. Garretson, M.D., D.D.S., late lecturer on Anatomy and Surgery in the Philadelphia School of Anatomy; Late Professor of the Principles and Practice of Surgery in the Philadelphia Dental College, etc. 700 pages. Illustrated with Steel Plates and numerous Wood-cuts. Philadelphia: J. B. Lippincott & Co , 1869.

Within a few days a copy of the above work has been received from the publishers. As the period is too limited to afford time for that careful perusal which a work of its importance and value demands, it will be necessary to postpone the review until the next number, particularly as the matter for this one is in the hands of the printer.

The too common practice which prevails of looking at the title-page of a work, the table of contents, turning over a few pages here and there, and then scratching off hastily a laudatory or condemnatory notice, made up of stereotyped expressions, is not only unjust to an author and his publishers, but discreditable to journalism. Considerations such as these doubtless influenced the committee of the American Dental Association, to whom an incomplete copy of the work was handed for examination. Fully appreciating its value, they felt it would be an unwarrantable act to express a flippant opinion on a work which they had not the time then to read. The work has been adopted as a text-book by a number of the dental colleges, and this may be regarded as a favorable indication of what its reception will be on the part of the profession.

J. H. McQ.

Transactions of the Odontological Society of Great Britain. New Series. London: Printed and published by the Society. 1869.

This excellent organization is publishing its Transactions in monthly numbers, four of which (March, April, May, and June), along with a list of the members, have been received. The papers read before the Society, and the discussions thereon, are of an eminently practical character. The interest manifested by the members, in their donations to the library and museum, reflect credit upon the organization, and the collection, by the continual aggregation of years, must prove of vast value to the present and future needs of the Society. J. H. McQ.

A number of Books and Magazines have also been received from different parts of this country, England, and Germany, which will be noticed in the next number.

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEORGE J. ZIEGLER, M.D.

"*Diathesis—A Contribution to the Theory of.* By David J. Brakenridge, M.D., F.R.C.P.E., Physician to the New Town Dispensary, Edinburgh.—In ancient as well as modern times various temperaments or diatheses have been recognized as exercising a most important influence on the origin and type of disease. Each of these exhibits a special proneness to certain forms of morbid action, and an equally remarkable immunity from others, while such maladies as are common to more than one are modified accordingly.

"An intimate knowledge of these constitutional predispositions is of great importance to all accurate treatment and prognosis.

"It is, however, probable that until we have some clear ideas regarding the origin and nature of these diatheses themselves, their recognition will fail to have much influence on the advancement of our knowledge of disease and its treatment. The very possession of so many familiar pictures, each bearing a well-known name and character, is apt to blind us to the fact that underlying them is a mine of most valuable truth. The following views have for some years afforded to my own mind a satisfactory explanation of the probable nature of diathesis, and have frequently guided me in deciding upon the treatment to be adopted in particular cases. As they differ from any I have hitherto seen, I offer them in the hope that they may throw some light upon this obscure and interesting subject. In this paper I shall confine myself as much as possible to the general treatment of the subject, and to the influence of climate in the production of diathesis, as the principal, although by no means the only, modifying agent. The consideration of the bearing of these views upon the particular diathesis I reserve for a future communication. The subjects which I propose to discuss at present fall under the following heads:

"1. The functional powers of all animal organs are developed by exercise, being perfected in proportion to the amount thereof.

"2. The means by which organs are thus educated are those conditions which call forth their activity; hence in the same body some organs may be highly developed while others are comparatively little so.

"3. The constitution thus tending to become adapted to those external influences to which it is constantly exposed, modifications of structure and function are, after a time, rendered so far permanent as to be more or less hereditary.

"4. Relative health, under any given set of circumstances, depends upon the perfect adaptation of the physiological habits to those circumstances. Absolute health is to be met with only where the balance of development of the whole body is maintained.

"5. The wider the range of the education, the more vigorous will be the health, and the greater the range of circumstances under which it may be preserved.

"6. While this habitual condition of the constitution is the only one compatible with health in the circumstances under the operation of which it has been developed, under altered circumstances it becomes the predisposing cause of disease, and is thus manifested as a diathesis.

"7. The conditions under which a diathesis is developed being the opposite of those under which the diseases depending on the diathesis are generated, the means employed for the treatment of the latter will be the opposite of those necessary for the alteration of the former.

"1. *The functional powers of all animal organs are developed by exercise, being perfected in proportion to the amount thereof.*

"Within certain limits, the great importance of the law of habit in education and development is well understood. Did facility not come with frequent repetition, progress would be impossible.

"To those who desire to become skilled artisans, musicians, gymnasts, tea-tasters, auscultators, microscopists, etc., the certain knowledge of such a law is unquestionably the stimulus to those arduous, and apparently fruitless, tasks which are so perseveringly undertaken. As this law in its most comprehensive sense will be often alluded to in this paper, I may, at the outset, state that, when habit or the result of education or training is spoken of, there is implied a power of performing an operation acquired by frequent repetition, and due to a gradual education of the presiding nerve centres in certain directions, and perfecting of the whole apparatus necessary for carrying out the operation, so that nerve-force acts more readily and effectually in such a channel than before, or than through any less educated media. In the examples given above, and many others, it is well known that the muscular apparatus or the special senses are capable of being trained to a remarkable extent. Almost every case of vital action which has come under observation demonstrates how invariably repetition is followed by increased power and facility of performance. But in many of those unseen processes which are constantly taking place within the body the same law has not been clearly recognized. Yet if it does apply to these, as well as to the more obvious acts of the body, the vast importance of such a fact cannot well be over-estimated. That the internal organs of the body do undergo an education and development in functional power proportioned to their exercise will, I think, appear from the following illustrations.

"There is ample ground for believing that some lungs habitually do much more work than others. The amount of hydrocarbonaceous food which the Esquimaux consumes, in order to maintain the normal temperature of his body, exceeds by many times that required by a healthy adult in our own country. The carbon contained in this must, in the form of carbonic acid, for the most part pass off by the lungs in exchange for a proportionally large amount of oxygen. But as this exchange constitutes the chief function of the lungs, it follows that those of the Esquimaux do many times the amount of work done by ours. And the ability of their lungs to perform such work is, by training, rendered so many times greater than that of ours. This can be easily proved. Admit, for the sake of argument, that their habitual amount of respiratory work is only double ours—a very moderate computation—and assume that our respiratory power is equal to theirs. If the latter is true, one of our lungs will, if required, be able to perform without embarrassment the work of both lungs, or double its present work, the amount allowed to be habitually performed by the lung of the Esquimaux. Such being the case, when the function of one lung is suddenly and completely arrested by disease, the whole amount of respiration should be quietly taken up by the remaining healthy lung.

"Experience, however, abundantly shows that the embarrassment produced by such partial arrest of function is so great as often to cause speedy death. Hence it must be granted that in cold climates the lungs are not only more active, but are proportionally more highly developed and stronger than in warm. We have, I think, a further proof of this in the results obtained by Dr. Edward Smith, in the admirable experiments made by him to ascertain the influence of season on the exhalation of carbonic acid. He found not only that the activity of the lungs, measured by the amount of carbonic acid given off, was greater in winter than in summer; in cold than in warm weather, rising and falling with the fall and rise of the thermometer; but that the uniformity of this response presented the following anomaly, which we give in his own words: 'The effect of temperature was very marked, but it failed to account for the great variations which were observed, and it was abundantly proved that, with the same temperature in the spring and at the end of summer, the amount of carbonic acid evolved was far less at the latter than at the former period. That mere degrees of temperature will not suffice to measure the results, may be seen by noting the quantities evolved in various months with the same temperature—as, for example, 59°, when the quantities were 8·11, 9·13, 7 64, 7·3, and 6·76 grains per minute in April, May, July, September, and October, in their order.' ('Cyclical Changes in Health and Disease,' p. 153.) Here, doubtless, winter's use and summer's comparative disuse of the lungs, giving rise to a corresponding increase of power in the former and decrease in the latter season, sufficiently explains how, with the same demand made upon the lungs, one grain more per minute was exhaled in spring than in autumn.

"In a paper 'On the Influence of a Digestive Habit in the Production of Tuberculosis' (*Medical Times and Gazette*, June, 1868), I have endeavored to show that the organs of digestion undergo a similar development in nature and degree proportioned to their exercise, a special education being required for every decidedly different substance. Without such a training, the power to nicely adjust a most complex process to the necessities of each case would be wanting, and perfect digestion of any substance would be impossible, although the necessary organs remained quite free from actual disease—just as the hand and eye of the musician, however perfect anatomically and physiologically, are quite incapable of transferring a difficult piece of music from the paper to the instrument without a power to do so, acquired by long and steady practice, existing in them and their presiding nerve centres. So special is this education that the training necessary for one fat or oil does not serve for all substances of the same class. Each requires a special modification of the powers; hence, as is well known, one form of fat or oil can often be taken when others are rejected.

"Many phenomena connected with disease appear to me to come under this law, such as restoration to apparent health after the loss of part of an important organ.

"'If one kidney,' writes Sir Thomas Watson, 'wastes, or is spoiled by disease, an increase of function devolves upon the other, and, by a beautiful law of compensation, the sound organ, without any alteration of its peculiar fabric, enlarges. The same is observed to be the case with the lungs.' I do not, however, think that this enlargement—although it is undoubtedly an early result of suddenly increased function

—sufficiently accounts for recovery in such cases. The following appears to me to be the most satisfactory explanation: All organs of the body being capable of an almost unlimited amount of training and development, when a portion of one has perished, the remainder, if healthy and sufficient in amount to avert actual death, may, by education, become quite capable of taking up the work of the lost portion in addition to what it previously performed. The lungs and kidneys of the Esquimaux, although capable of performing many times the amount of work done by those of the negro, do not greatly exceed his in bulk. In like manner, when an organ has been partially destroyed by disease, we should anticipate recovery rather through an increase of power than of size on the part of the remainder.

"2. *The means by which organs are educated are those conditions which call forth their activity; hence in the same body some organs may be highly developed while others are comparatively little so.*

"However various or changeable the state of the surrounding influences may be, it is necessary to the maintenance of health that, within the body, uniformity of certain conditions should be preserved. For this purpose a most complex machinery is provided, having arrangements specially adapted for every kind of climate. It is owing to this admirable provision of a number of organs intimately related in function one to another, and presided over by closely associated nerve centres, that the habitual powers of the body were capable of becoming adapted to the most varying circumstances, and that man in a healthy state is to be met with in every region of the earth, however extreme its climate. As it is against the influence of external agencies that this highly efficient organic apparatus is intended to operate, the direction will be given to its activities, and consequent development and powers, by the prevalent conditions to which it is exposed. Should an equal amount of work be thrown by these upon each organ—as is probably the case in temperate climates—the balance of development will be preserved. In extreme climates it will not be so. Under the influence of such, a maximum pressure will be exerted on one set of organs, a minimum on the remainder, and the corresponding development and functional powers will be unequal. Hence the organs and functions most perfect under a cold climate will be least advanced under a hot one, and *vice versa.* Each variety of climate will give rise to an answering modification of the constitution.

"That other circumstances than climate influence the type of constitution is unquestionable. Man's body is not merely a machine regulated by the physiological necessities imposed upon it by a surrounding atmosphere, but is, besides, the habitation of a governing mind not less peremptory in its demands. He has, moreover, in his position and surroundings in the social world another series of influencing circumstances to which he must become adapted. A powerful effect is thus produced upon the constitution by the restraints of poverty and the license of riches, by occupation and its accompanying conditions, by social customs, and by the self-imposed restrictions and indulgences of religious or other belief. In our own land, a marked difference of configuration and constitution is observable between the extreme ranks of society. But the striking influence of even purely self-imposed conditions in antagonism to that of climate is well seen in the two following opposite examples. On the one hand, strictly different habits of thought and

diet have, notwithstanding the influence of the same climate, for several thousand years maintained a striking difference of general appearance between the different castes in India. On the other hand, uniformity of customs and creed, dating from an even more remote period, has preserved the typical characteristics of the Jew against every variety of climate.

"3. *The constitution thus tending to become adapted to those external influences to which it is constantly exposed, modification of structure and function is after a time rendered so far permanent as to be more or less hereditary.*

"From what has already been said, not only is it evident that the organs of the body must gradually come to harmonize in their habits with surrounding influences, but it is also most probable that what was originally an acquired property will become in each succeeding generation more and more an inherited part of the constitution. In animals we find that habits acquired by training are thus transmitted to the offspring. A certain race of dogs, for example, has originally been taught to point, and now the puppies of that race 'may be seen pointing at swallows or pigeons in a farmyard.' 'The breed of shepherds' dogs,' also, 'often display an extraordinary hereditary sagacity respecting their peculiar avocations.' Organs which have become educated and developed to an unusual degree by increased use and activity are also after a time inherited in this condition. Thus, in Europe, the constant practice of milking has gradually enlarged the udder in the cow, and this peculiarity is now inherited. In like manner, after prolonged subjection to climatic training, a race will come to inherit a special adaptation of organic power to the particular climate. After a time such adaptation will cease to be acquired by each individual, the infant being from birth so constituted. The rapidity with which this change is effected from the entirely acquired to the entirely inherited, depends chiefly on frequency of repetition. Hence, as climate imposes upon the body constant demands, which meet with an unceasing responsive effort, we can understand that the acquisition of inherited power will, in this case, be much more rapid and decided than in the case of any volitional act. The extent of the change from previous conditions, and the consequent amount of organic alteration thereby necessitated, will influence the time required, lesser modifications being more speedily established than greater ones. The power to perform habitual acts is never altogether a permanent attainment of those by whom it has been acquired, but is, on the contrary, maintained with difficulty, and, for the most part, readily lost. Some portion, however, of such acquired power is always retained—those who have once learned any difficult performance being able to reacquire it much more readily than those to whom it is entirely new. The amount of power transmitted to the offspring in such cases probably bears some relation to this permanent portion of acquired habit. In each succeeding generation, provided the training is kept up, this will be still further augmented and confirmed, until ultimately the perfect power will be inherited. Instinct may, in like manner, be habit originally acquired, and persistently cultivated through many generations, until structure has gradually become so modified, to favor the easy performance of the particular act, that it becomes the most natural effect of outgoing energy. Acquired power must, in strength and permanency, fall far short of that which is inherited. The

infant who inherits perfect adaptation to a particular climate, is thus a very differently constituted being from the infant of a stranger born in the same climate. The latter is, in this respect, in danger from the first; the former possesses from its birth immunity from risk; the latter has to be educated and developed; the former has merely to grow.

"4. *Relative health under any given set of circumstances depends upon the perfect adaptation of the physiological habits to those circumstances. Absolute health is to be met with only where the balance of development of the whole body is maintained.*

"*A. Relative Health.*—When the powers of the system are so developed as readily to respond to all the demands made upon them by surrounding agencies, the body is in a state of relative health. As each decidedly different locality varies somewhat from all others in climate, each will be represented by a different state of the organs in health. We have already seen that harmony of the habitual activities of the constitution with surrounding requirements depends upon an education which can be had only under the influence of the more or less continuous operation of these demands. Hence it may be safely assumed that, other conditions being equal, the most healthy persons in any given locality will be found among those who have spent their own lives there, and whose ancestors have dwelt there for many generations. These have inherited a constitution relatively healthy. It is evident that the body, as its various organs exist in definite, and, it may be, different degrees of development, can only operate safely under such conditions as will exercise each organ proportionally to its power. Circumstances so completely harmonious with the existing state of the body are, however, not likely to be met with, except in the locality where the constitution has been formed. The popular belief in the healing virtue of the native air is founded upon the recognition of facts, of which the foregoing may be regarded as the explanation.

"*B. Absolute Health.*—In body, as well as in mind, development, to be perfect, must be equal. Therefore, although it is true that the highest education of particular organs is to be met with in extreme climates yet, as along with this there is the lowest development of others, the balance of all the organs is not maintained, and the animal is, as a whole, imperfect. This is, as we can understand, a condition incompatible with the greatest vigor and activity of the body; hence we do not find man in his highest condition in any extreme climate. The regions in which man has attained his highest development and made the greatest advances lie midway between the extremes, enjoying what, from its evident suitability to the human frame, has been called a temperate climate. Under the influence of such, although individual organs may be less advanced than elsewhere, the body, as a whole, is more perfect. Such an equal development is most compatible with that vigor and enjoyment of life which constitutes absolute health. Man instinctively craves such a state. It is not improbable that the periodical longing for change of air and locality experienced by most persons springs from some disturbance of the balance caused by local conditions. The satisfaction of such a longing is not essential to relative health, but it is in the direction of a higher and more perfect development. It is a familiar fact that, in marriage, opposite temperaments attract one another, and it is not unlikely that this arises from a similar intuition of a beneficial character, as we shall again see.

"5. *The wider the range of the education, the more vigorous will be the health, and the greater the range of circumstances over which it may be preserved.*

"Were the constitution limited to one constant, unvarying set of influences, health would be incompatible with the slightest deviation from this. The provisions of nature secure a considerable variety in this respect. In the rotation of the seasons we have a constant succession of changes which check the tendency of the body to fall into a too narrow series of habitual activities. The width of education thus afforded renders it possible to move with comfort and safety to considerably distant localities at seasons when their climate approaches in character to one or other of the seasons in the native climate. Thus we may indulge in a change to colder places during their summer if it is not colder than our winter, and to warmer places during their winter if it is not warmer than our summer.

"It is evident that the extent of this capacity for change must be regulated by the range of conditions to which the body has been accustomed, being greater or less according to the variability or equability of the developing climate. The development brought about by any one locality must, however, be, at the best, very limited compared with man's capacity. Doubtless the craving for change which man feels with regard to many things is not without its physiological importance. Such deep-seated yearnings as the love of travel, and the great inventions to which, for its satisfaction, it stimulates him, hint that this local development, even where the balance of functional power is best preserved, by no means represents the highest state which he is capable of attaining. He possesses—in a rudimentary condition it may be, but none the less truly—powers which, were they all fully educated, might render him cosmopolitan. Greatly increased rapidity of locomotion is already doing much to extend the range of his physiological education, and, in addition, the blending of different races which is thus favored, and the consequent intermarriages of those possessing constitutions widely different, will hasten the higher development of the whole race. For when we have the organs, which in the one parent are highly trained, uneducated in the other, and *vice versa*, it is reasonable to suppose that the positive, and not the negative, properties of each parent will have the greater tendency to be transmitted to the offspring; hence it will possess somewhat of the special powers and capacities of both. Thus the offspring of aboriginal and European parents in Hindostan is said to 'inherit from the native parent a certain adaptation to the climate, and from the European a higher development of brain.' (Combe's 'Constitution of Man,' p. 194.) Many examples might be adduced to show that mixed races of men surpass in vigor and in the tendency to multiply the parent races from which they have sprung. It must, to a considerable extent, be regarded as the explanation of the high vigor of the Anglo-Saxon race, that in it there are blended together so many constitutions, originally very differently educated, and consequently possessing widely different powers.

"6. *While this habitual condition of the body is the only one compatible with health in the circumstances under the operation of which it has been developed, under altered circumstances it becomes the predisposing cause of disease, and is thus manifested as a diathesis.*

"That very perfecting of the animal mechanism which secures its

most efficient working under a given set of conditions, becomes, when these conditions are greatly altered, the source of derangement. For if unexpected demands are made upon the weak organs, and these are still further increased, as is the case in many instances, by the continued, although no longer necessary, activity of those organs which habitually work well, it is not surprising that deranged function, congestion, or inflammation should be the result. For the sake of illustration, we may assume that in cold climates, while the kidneys, lungs, and organs connected with fat digestion are well developed and educated by activity, the skin, liver, etc. are deficient in functional activity and consequent development, this arrangement being necessary for the generation and conservation of a sufficient amount of heat. Let such a constitution be transplanted to a hot climate, where the demands are exactly the reverse, and what must be the consequence? The liver, skin, and bowels, comparatively untrained and weak organs, are suddenly called upon to act energetically to keep down the heat of the body, and functional or structural disease is the result. Hence that very condition of the organs which was so suitable for the maintenance of health under former circumstances is here diathetically predisposed to diseases of the liver, skin, and bowels. What we have thus assumed to be the maladies most likely to affect those going from a cold to a hot climate are shown by the writings of the highest authorities to be the disorders which actually result from such a change. The converse of the foregoing has also been amply verified by experience in the case of natives of warm climates who have changed to cold ones. In these the lungs, kidneys, and digestive organs are most likely to suffer, and particularly from those tubercular disorders which result from the non-digestion of fats. These examples I have merely sketched for the purpose of illustrating my proposition. It is impossible, in so narrow limits, to discuss fully and exhaustively these and the numerous other constitutional modifications which depend on an equally great variety of influences. Suffice it for the present that I make my meaning clear. It is, I think, evident that, while a diathesis becomes manifest as such only under circumstances which elicit its proneness to certain diseased actions, it is formed under very different conditions. The diathesis, where its essential constitution has been built up, is a salutary relation of the body to surrounding agencies—a healthy response of its organs to all the demands made upon them. It is only when it is transplanted to an altered set of influences that inconvenience from it begins to be experienced.

"Diathesis will manifest itself variously, according to the direction in which the change is made. A predisposition to quite different diseases, for example, will arise in the European, according as he moves northward or southward. It is well known that those whose ancestors have for generations been healthy inhabitants of a particular district, whose own health has previously been good, and who have inherited no apparent predisposition to disease, invariably discover, on making their first great change of climate, that they have weak points of which they were until then ignorant. Nor is a great change necessary. A hundred miles—often much less—may bring the traveler into a climate sufficiently new to be trying. It is the common experience of those coming from not distant counties to reside in the Scottish metropolis, that several years elapse before the constitution becomes adapted to its severe spring seasons.

"So numerous and various, however, are the diatheses which we encounter on every hand, that any attempt to unravel the tangled web may well appear, at first sight, to be quite hopeless. Only by tracing out thread after thread can we do it successfully. By taking a diathesis, and thoroughly analyzing its strength and its weakness, noting the diseases from which it is free, and those to which it is prone, and then ascertaining which changes of climate or of other conditions give rise to similar manifestations, we shall gradually arrive at such a knowledge of its probable causes and nature as may prove a useful guide to us in our treatment.

"7. *The conditions under which a diathesis is developed being the opposite of those under which the diseases depending on the diathesis are generated, the means employed for the treatment of the latter will be the opposite of those necessary for the alteration of the former.*

"The cure or removal of diathetic weakness resolves itself very much into the question of acclimatization; for climate must be regarded as the chief cause of constitutional modification. It is, of course, quite unnecessary to attempt the removal of a condition of the body which is highly beneficial under certain circumstances, unless those circumstances are to be altered. In the latter case a right anticipation of the effects likely to be produced by any particular change may be of the greatest importance. Many might thus be deterred from exposing their bodies to risks of which they would otherwise be ignorant. Even in cases where great changes must be undertaken, to be forewarned is to a great extent to be forearmed. Much may be done to ward off danger, through a previous knowledge of the directions in which it is likely to assail. We have already seen that all organs of the body are capable of a certain amount of education. In this process the work must be gradually increased as the power to accomplish it increases. Great and sudden augmentation of effort will prove disastrous. Hence it is not surprising that, where extreme changes of climate have been at once attempted, acclimatization has been pronounced impossible. The history of many a colony, and the high mortality among European troops sent at once to tropical stations, testify to the fact that without constant new arrivals a race thus transplanted would soon die out. The sacrifice of human life brought about by such sudden transitions is so great that it is of the utmost importance to understand how it is caused, and how alone acclimatization can be safely accomplished. In the adult great changes must in all cases be regarded as unsafe. High prospects in a foreign land are, however, often held out to the youths of a family, and it may be the duty of the parents to train them up so as to be able to avail themselves of these advantages. Analogy leads me to believe that, by a careful and gradual special education of the organs commenced in early life, much might be accomplished in this direction. We have seen that an internal organ, such as the lungs or liver, does undergo a development proportioned to its exercise, and it is probable that, by a carefully graduated scale of exercises, its functional powers might be developed as readily as those of the muscles or the organs of special sensation. Mr. Darwin speaks of 'an innate wide flexibility of constitution' as being 'common to most animals,' upon which 'adaptation to any special climate can be readily grafted,' which is, in reality, this readiness of the organs of the body to become educated so as to respond to new or increased demand. Such training, however, to be suc-

cessful, must be gradual. During their earlier years the children should be cautiously moved through intermediate climates towards that in which they are ultimately to reside, a few years being spent at each in turn of a number of places by degrees approaching in climate to their final destination. Thus acclimatization might, to some extent, be effected in one generation. Such a plan may appear quite impracticable; but I fear there is no royal road over so great a difficulty. Again, the serious sacrifice of life resulting from the system of garrisoning our foreign stations with recruits fresh from home demands the deepest consideration. If our tropical colonies are to be garrisoned by English troops, they should have a permanent army, consisting of men whose constitutions have, in early life, by a gradual removal from home through intermediate colonies, become educated and modified to suit the new conditions. Or the recruits should be taken from acclimatized families in some of the intermediate colonies approaching to the one alluded to in climate, these again being recruited from those still nearer home. Thus, a constant current of Anglo-Saxon blood, bearing with it English vigor, ideas, and customs, would be maintained, passing safely and profitably to the most distant British possessions. It must, however, be borne in mind that acquired organic power cannot be so perfect as that which has, for many generations, been inherited.

"In the next place, the actual diseases which specially merit the name of diathetic are those connected with the organs and functions which, in the particular form of the constitution, are habitually weak. In most cases these disorders result from unusual augmentation of function, caused by change of circumstances, and rest to the overworked organs is clearly indicated. This will be best obtained under the influence of conditions which make small demands upon their activity, and those under which the constitution has been formed are most likely to meet this requirement. While this is to be remembered in all cases, it is most clearly indicated when organic or functional disturbance has followed recent change of locality in a person not previously so affected. Here it is highly probable that an alteration in the surrounding influences is the cause, and it is evidently our duty to advise a return, if possible, to the native air until the disturbance subsides, and then to direct our treatment to the careful cultivation of those weak points which have manifested themselves. By judicious management much may be done to mitigate the risks of change. This is, however, impossible, unless the nature of those risks be understood. I would here again reiterate my belief that, in cases of partial loss of an organ, when the remainder is healthy and sufficient in amount to ward off immediate danger, we may hold out considerable hope of gradual recovery to the patient. The grounds upon which we venture to anticipate such a result will make us careful to see that such a gradual process of recovery is favored. The reason why such recoveries are so few is apparent. Undue haste, arising from ignorance of the principles upon which they are to be effected, often frustrates the possibility of such a happy result. If we are to succeed, both we and our patient must be content to keep up our efforts and our hopes for months and years, instead of days and weeks.

"What we often attempt with medicines is to educate organs—sometimes to perform their own functions better, sometimes to take up the functions of other organs which have ceased to be able to perform them. We do the former when we stimulate a sluggish liver into its proper

activity. We do the latter when, in the case of organic disease of the kidneys, we administer purgatives. Our treatment here is evidently an effort to teach the bowels to excrete those substances which have been wont to pass off by the kidneys. It is a practical application of the law of community of function, which Dr. Carpenter thus describes:

"'As in the simplest or most homogeneous beings the entire surface participates equally in the act of imbibition, so, in the most heterogeneous, every part of the surface retains some capacity for it; since, even in the highest plants and animals, the common external integument admits of the passage of fluid into the interior of the system, especially when the supply afforded by the usual channels is deficient. In the same manner we find that whilst, in the lowest animals, the functions of excretion are equally performed by the entire surface, there is, in the highest, a complex apparatus of glandular organs, to each of which some special division of that function is assigned; but as all these glands have the same elementary structure, and differ only in the peculiar adaptation of each to separate a particular constituent of the blood, it is in conformity with the law just stated that either the general surface of the skin or some of the special secreting organs should be able to take on, in some degree, the function of any gland whose duty is suspended; and observation and experiment fully bear out this result.'"—(*Comparative Physiology*, p. 131.—*Medical Times and Gazette.*)

Exudation of White Blood Corpuscles.—The *Medical Times and Gazette* says that, in a most interesting report to the Royal Irish Academy on Cohnheim's researches on suppuration, Dr. J. M. Purser "stated that he had been able to verify all Professor Cohnheim's observations relative to the passage of the white blood cells from the interior of vessels supplying an inflamed surface into the surrounding tissues. Dr. Purser's experiments were made chiefly on the mesentery of the frog, but he also experimented on young rabbits for the purpose of comparing the course of events in warm and cold-blooded animals. This he found to be, in all important respects, the same in the two classes. The paper was illustrated by drawings representing the so-called amœboid movements of white blood corpuscles, as also the pavement epithelium and 'stomata' of blood-vessels."

"*Non-venereal Syphilis.*—At Christiania, Dr. Bidenkap informed me that cases of accidental contagion of syphilis were far from uncommon among the Norwegian peasantry. Frequently several members of the same family, some mere children, and others grandparents, would apply together, with a history which made it certain that most of the inoculations had been quite unconnected with venereal acts. Often the primary sore had occurred on the mouth. He explained the frequency of these occurrences by reference to the habit of using the same drinking utensil, same spoon, etc., often without any preliminary washing. Other Norwegian surgeons confirmed Dr. Bidenkap's statement as to the frequency of these irregular modes of contagion. I have already mentioned the example of it which I saw at Molde, and the opinion expressed by Dr. Sund, of that place. Probably the contagion is frequently from secondary sores, mucous patches, etc."—(Jonathan Hutchinson, *Medical Times and Gazette.*)

Hæmostatics.—In an able address on surgery to the British Med. Assoc., Mr. Thomas Nunneley observed (*Med. Times and Gaz.*): "I have instituted numerous experiments by adding various substances to blood just drawn and still fluid, to coagulate blood, to the serum alone; and, also, I have applied several of these, as pure alcohol, permuriate of iron, chloride of zinc, tannic acid, tincture of benzoin, sulphate of alumina, etc., to wounded and lacerated parts, for the purpose of ascertaining their effect, and the power which the resulting compound has of resisting decomposition and of being absorbed. Some of these, as the strong mineral acids, rather change and decompose the blood than simply coagulate it. Though the resulting compound, even when freely exposed to the air, will remain for many months unchanged, they are unsuited for employment; for, if strong, they destroy the tissues, and, if weak, are not effectual. Chloride of zinc forms with the blood a solid mass, which is not so dense or resisting as that formed by carbolic acid or permuriate of iron, and a greater proportion of the substance is required to produce a corresponding effect. Alcohol forms a dense coagulum, tincture of benzoin answers still better, forming an odorous, solid, moderately unchangeable mass, and, I believe, deserves much of the credit so long attributed to the balsams; carbolic acid at once coagulates the blood, and forms a dense leathery mass, which decomposes very slowly; with the serum it forms a similar, but, as might be supposed, a less dense mass, from which fluid exudes. Permuriate of iron, of all these substances, appears to answer best. It acts promptly, a small quantity only is requisite, not more than one-sixth of the quantity of pure carbolic acid being required; it does not destroy or injure the bed-linen, as the acid does. The compound is dense, adherent, very unchangeable, and, being composed of only those substances which normally enter into the composition of the animal body, is more adapted for innocuous absorption, if not for actual assimilation and incorporation with it. Alum forms a firm coagulum, and tannic acid answers admirably, forming a soft leathery mass, which is very unchangeable. Though the compound of blood and iron will remain without decomposition for months, a white mould forms in it much sooner than in the compound of blood and carbolic acid. It is also more soluble in water than is the latter. A small portion of a solid mass of three ounces of blood, with which two scruples of permuriate of iron had been mixed two months before, and exposed to the air with only a paper covering, was put into water, in which it became partially dissolved. A like portion of a compound of three ounces of blood, with two drachms of pure carbolic acid, was similarly placed in water, and, after a month's exposure, hardly any, if any, was dissolved. If solution be necessary for absorption, the experiment would lead us to infer that the iron compound is more readily absorbable than the carbolic acid compound."

"*Physiological Action of the Methyl and Allied Series.* Report to the British Association for Advancement of Science, by Benjamin W. Richardson, M.D., F.R.S.—The author, in the first place, recalled the work of previous researches, and laid before the section reports and notes on the value and administration of bichloride of methylene as a general anæsthetic from Mr. Peter Marshall, Dr. Junker, Dr. Taylor (of Nottingham), Mr. Bader, Mr. Rendle, Mr. James Adams, and Mr. Wood (of Brighton). These reports had reference to the experience on

the action of the substance in the Hospitals of Guy's, London, Charing Cross, and Samaritan. They went to prove, each in their respective ways, that the bichloride is equally applicable to the shortest as to the longest operations. In operations on the eye, Mr. Bader begins to operate in twenty seconds after inhalation, and operates without pain, and sees his patient fairly recovered often in three or four minutes; while Dr. Junker has sustained deep anæsthetic sleep by the vapor for one hour and thirty-five minutes. Dr. Taylor reported that of late he introduced the bichloride to Von Graefe, who now employs it with much success in his clinique. In recording his new researches, Dr. Richardson explained that he had so arranged his work as to put the examination of the physiological action of all the substances used side by side with the chemical constitution of the substances. Thus he grouped his substances in tables under five heads—the nitrites, the hydrides, the alcohols, the chlorides, and the iodides—introducing respectively the representatives of each series from the methyl up to the amyl group. At the close of each chapter on different series he gave a general review of all the facts. He showed that the nitrites act chiefly and always primarily on the sympathetic nervous system, and that the hydrides are negative substances, insoluble in blood, unirritating, but, in many minor applications of medicine, of great service. He held the alcohols to be strictly anæsthetic substances, and was unable to separate them from the other chemical bodies under observation. The chlorides are simple anæsthetics, and the iodides produce at one and the same time general insensibility and increased secretion from glandular structures. In regard to all it was shown that their action on animal bodies is attended invariably with decrease of temperature, and that the effect in all cases is more determinate, as the weight of the substance is increased by increase of carbon. In the course of the different essays from which these general inferences were drawn, several new and useful additions to medicine were carefully noticed. Among these may be specially named hydride of amyl, iodide of butyl, and chloride of amyl. In a further chapter the mode of proceeding in cases where the administration of narcotic agents had produced dangerous and apparently fatal effects was discussed, and a new instrument for artificial respiration was described." —(*Ibid.*)

Bisulphuret of Carbon in Poisoning. By Dr. Wm. R. Smith, of Cairo, Ill. (*Chicago Medical Times.*)—"In poisoning, from opium and its salts, and the effects of chloroform, it supplies a place that no other article will fulfill. I am confident that I have saved several lives that would have been lost had I trusted to any other means. To illustrate, I will give some cases in practice.

"An 'unfortunate' concluded to end her life by committing suicide. She procured an ounce of chloroform; after dressing herself for the grave, laid herself out on a bed. She then saturated a handkerchief with the whole ounce, spread it over her face, and covered her head with a quilt, so she got the full benefit of the chloroform with but very little air. It is not known how long a time elapsed before she was found. When I saw her she was to all appearances dead. She did not breathe, was pulseless, and I could not detect any action of the heart by auscultation. I saturated a towel with pure bisul. of carbon and applied it the whole length of the spine, and within a minute she began

gasping for breath. In less than five minutes she was begging to be taken out of the fire, and in an hour was up and about.

"For a child of 20 months with intermittent fever I made the following prescription:

℞.—Quiniæ sulph. gr. viij;
Acidi sulph. arom. q. s.;
Aquæ cinnamomi,
Syr. tolutani, āā ℥ss.
M. S. A tablespoonful every two hours.

"The druggist put up morphia in place of quinia. The child took one dose, and in 15 or 20 minutes got sleepy, when its mother put it to bed, and did not pay any attention till time for the next dose of medicine, as it seemed to be sleeping very soundly. It was over half an hour after this before I saw the case, so that two and a half hours had elapsed since the dose was taken. Its condition was as follows: Respiration 6 per minute and stertorous, pulseless, bathed in a cold perspiration, the whole surface cold except the head, which was unnaturally hot, and the pupils contracted to mere specks. I applied to the spine and all over the breast a mixture of equal parts of bisul. of carbon and sprts. camphor and cold to the head. Within ten minutes the little one was crying lustily to quit burning her. I then gave her a strong infusion of coffee, and as she was very thirsty, she drank a large teacupful and vomited for the first time since she had taken the morphia. I had to keep her awake for about six hours by occasionally dashing ice water in her face. Within about two hours after first arousing her, the relapse or secondary effects came on, and had to apply the bisul. of carbon again, but not in as large quantities. She was troubled for 36 hours with incontinence of urine, and had an unnatural expression of the eyes for ten days or two weeks. The teaspoon in which the medicine was given was a large one and held fully a drachm, so she got a grain of morphia. There was no doubt about it being morphia, for I had it analyzed by Enno Sander, Ph.D., of St. Louis."

Thymic Acid.—"M. Bouilhon, pharmaceutist, has proposed to substitute *Thymic Acid* in medical use for carbolic acid, of which it is the homologue; it has an agreeable odor, and combines with the animal tissues, so as to render them completely imputrescible. It is procured by treating oil of thyme with an alkaline solution, adding an acid to decompose the soluble thymate formed, and purifying it by washings and distilling. It may also be obtained in crystals by submitting oil of thyme to a prolonged cold. Whenever it is desired to administer it internally, it is better to make an emulsion with, or to dissolve it in an alcoholized potion.

"Dr. A. Paquet has satisfied himself by several trials of the therapeutical value of this organic product, which may be employed, 16 minims to two pints of water, as a disinfectant, or to modify wounds of a bad character and obtain their rapid cicatrization. Concentrated, it advantageously replaces nitric acid and nitrate of silver in the cauterization of the dental nerves. Thymic acid combined as follows, Thymic acid 2, Aniline 1, Tannin 2, Glycerin 50, has enabled M. Paquet to preserve viscera and parts of limbs for several months, without any traces of putrefaction."—(*Bull. de Therap.* and *Ecl. Med. Journ.*)

"*Glycerin as an application to burns* is recommended by J. Fuchs. Through the explosion of a spirit-lamp the greater portion of his face had been covered with rather deep burns, which healed in a week by the immediate and oft-repeated application of glycerin, without producing blisters or festering, or leaving any scar."—(*Schweiz. Wochenschr.* from *Bresl. Gewerbebl.* and *American Journal of Pharmacy.*)

"*Drying of Animal and Vegetable Substances.*—Dr. Müller.—A large glass vessel, a tumbler for instance, is filled for about half its capacity with fused chloride of calcium, and over this a quantity of ether is poured; on the top of the glass vessel another suitable glass or porcelain vessel is placed containing the substance to be dried, and over these vessels, previously placed on a polished glass plate, a bell-jar is placed. The drying takes place in consequence of the fact that the chloride of calcium withdraws water continuously from the ether, and the vapor of the latter, in its turn, withdraws the water from the substances to be dried. It is stated that both animal and vegetable substances dried by this process retain their natural color, and that animal substances, moreover, retain their elasticity and flexibility."—(*Deutsche Ind. Zeitung. Chem. News.*)

"*Hardening Microscopic Specimens.*—Müller's fluid for hardening specimens for microscopic examination is as follows: Bichromate of potassa, gr. ij, sulphate of soda, gr. ij, and water, ℥i."—(*Medical Record.*)

"*Removal of Nitrate of Silver Stains from Woven Tissues.*—According to M. Grimm, chloride of copper completely removes, even from colored woven cotton tissues, stains occasioned by nitrate of silver; the tissue is to be afterward washed with a solution of hyposulphite of soda, and next thoroughly washed with water. From white cotton and linen tissues, nitrate of silver stains are more readily and effectively removed by applying dilute solutions of permanganate of potassa and hydrochloric acid, followed by washing with hyposulphite of soda solution, and rinsing in plenty of fresh water. By these means the use of the highly poisonous cyanide of potassium is rendered unnecessary."—(*Polyt. Notizblatt. Chemical News.*)

"*Researches on Resins.*—M. Sacc observes that resins have been very little studied at all; and his researches recorded in this paper extend to copal, amber, dammar, colophony, lac (or shellac), elemi, sandarac, mastic, and carnauba wax (a resin). The author has studied the more or less degree of readiness wherewith resins are reduced to powder, the action thereupon of boiling water, of alcohol of 86 per cent. strength, of ether, of ordinary acetic acid, of a hot solution of caustic soda of 1·074 specific gravity, of sulphide of carbon, of oil of turpentine, of boiled linseed oil, of benzine, of naphtha, of sulphuric acid of 1·83 specific gravity, of nitric acid of 1·329 specific gravity, and of caustic ammonia. All resins were applied in the powdered state; and the solvents, three times as large a bulk as that of the resins, have acted for at least twenty-four hours, at temperatures varying between 15° and 22°. The results arrived at are briefly as follows: All resins submitted to experiments fuse quietly when heated, excepting amber, shellac, elemi, sandarac, and

mastic, which swell up, and increase in bulk. Only the carnauba wax melts in boiling water; colophony becomes pasty therein, while dammar, shellac, elemi, and mastic agglutinate. Copal, amber, and sandarac do not change. Alcohol does not dissolve amber nor dammar; agglutinates copal, partly dissolves elemi and carnauba wax; while colophony, shellac, sandarac, and mastic are readily soluble therein. Ether does not dissolve amber and shellac; makes copal swell, and partly but slowly dissolves carnauba wax; dammar, colophony, elemi, sandarac, and mastic are readily dissolved therein. Acetic acid does not dissolve amber and shellac; causes copal to swell; somewhat acts upon carnauba wax, and does not at all act upon any other of the resins above named. Caustic soda solution readily dissolves shellac, with difficulty colophony, and has no action upon the rest. In sulphide of carbon, amber and shellac are insoluble; copal swells therein; elemi, sandarac, mastic, and carnauba wax are with difficulty dissolved therein, while dammar and colophony are readily so. Oil of turpentine has no action upon amber or shellac; causes copal to swell; dissolves readily dammar, colophony, elemi, sandarac, carnauba, and very readily mastic. Sulphuric acid does not dissolve carnauba wax; all other resins are dissolved and colored brown, excepting dammar, which becomes bright red. Nitric acid does not act upon the resins, but colors carnauba wax straw-yellow, elemi a dirty-yellow, and mastic and sandarac bright-brown. Ammonia does not dissolve some of these resins, but causes copal, sandarac, and mastic first to swell, afterward dissolving them; colophony is easily soluble therein."—(*Scientific American.*)

"*Oxidizing Properties of a Mixture of Nitric and Sulphuric Acids.*—A mixture of monohydrated nitric acid and Nordhausen sulphuric acid constitutes a most energetic oxidizing agent. In the cold it instantly oxidizes roll sulphur, sets fire to charcoal, soot, and phosphorus, ordinary or red, and converts, in a few minutes, arsenic into arsenious acid. On boiling the mixture in a retort, it gives off oxygen abundantly. In the cold, the mixture has, however, no action upon some of the most oxidizable metals."—(*Comptes Rendus* and *Drug. Circular.*)

"*Fusible Alloys.*—M. Stewart mixes 7·5 parts of bismuth, 4 of lead, 1·5 of tin, and 2 of cadmium, and thus produces an alloy fusing at 66°. We quote hereunder the composition of divers fusible alloys, respectively, so made that the quantity of bismuth of each is the same :—

	Newton's Alloy.	D'Arcet's Alloy.	Pelouze's Alloy.	Wood's Alloy.
Bismuth............	600	600	600	600
Lead................	375	300	360	320
Tin..................	225	300	240	160
Cadmium...........	—	—	—	120
	1200	1200	1200	1200

All these alloys fuse below 100°."—(*Chemical News.*)

"*Small Weights.*—H. Reinsch suggests, to weigh accurately a piece of aluminium wire, drawing a line of precisely the same length upon paper; divide it into the requisite parts in the well-known way, and cut the wire after marking the divisions upon it; each piece may then be bent to the shape of the figure it represents, thus V for 5, etc."—(*N. Jahrbuch f. Pharm.* and *Amer. Jour. Pharm.*)

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, NOVEMBER, 1869. No. 11.

ORIGINAL COMMUNICATIONS.

VULCANIZERS—THE DANGERS ATTENDING THEIR USE.

BY W. H. TRUEMAN, D.D.S., PHILADELPHIA.

(Read before the Odontographic Society of Pennsylvania, October 6, 1869.)

I KNOW of no better way of introducing the subject selected for this evening's discussion than to read to you a note sent to the Buffalo Dental Manufacturing Company, and the replies received. I wrote to them, as the manufacturers of the two most approved and extensively used vulcanizers in the market. It has been charged that many explosions have been caused by carelessness or unwise economy on the part of the makers; on this point the letters speak for themselves. Should the Society choose to pursue the subject any further, I would suggest the appointment of a committee to thoroughly test the actual amount of pressure these machines will bear. From the clear and detailed manner and the promptness with which they have answered my inquiries, this firm, at least, rather court than discourage investigation. On the 10th of September I addressed the following note to the above firm:

"The frequency of vulcanizer explosions, recently reported, has induced the Odontographic Society of this city to make the cause and best method of preventing such accidents a subject of investigation, and have requested me to prepare a paper upon it for their next meeting. In pursuit of information I have taken the liberty of addressing this note. . . . .

"I notice that, in the report of an explosion of a Whitney vulcanizer, in Dr. Chittenden's office, Madison, Wis., we are told that the vulcanizer had been in use some eight or nine years, and that when examined after the accident, the copper was only one-twentieth of an inch thick. What was the probable thickness of the copper originally? If it could be accurately ascertained, it would show what action (if any) the products of vulcanizing have upon the metal. . . . Have you, as manufacturers,

given any attention to this destructive action? How long can a vulcanizer exposed to it be used with safety; or perhaps, as some are used so much oftener than others, it would be better to ask: How thick must the copper be to withstand the necessary pressure? Do you think the one-twentieth of an inch sufficient? If some point could be fixed when the vulcanizer should be condemned as dangerous, the ease with which it could be examined with the calipers would save the careful operator much risk. . . . . In several cases recently reported especial attention has been called to the fusible plug not blowing out when it should. Is it possible that by frequent heating to near its melting point some change takes place, making it more infusible? . . . . In nearly all the cases so far reported the accidents have been to Whitney's. How is this? Can it be attributed to the fact that the thermometer bulb, being inside the chamber, is liable to injury by the pressure, and made to register *too slow*, and thus allow the strain to be excessive? How are they arranged at the present time? In the method adopted in Hayes' boiler, where the thermometer is placed in a depression outside the cover, filled with mercury, how do you prevent the mercury being lost by evaporation or accident? In the process of manufacture, is each individual boiler subjected to pressure, or only a few from each lot? How many pounds per square inch is the test? In Hayes' oven, is there any steam pressure when in use? Do they possess any advantage in regard to safety from explosion? . . . . Do you provide your vulcanizers with any safety-valve arrangement beyond the fusible plug? Can a valve be placed on Whitney's machine so as to be out of the way when screwing up? As regards safety, has either pattern any special advantage? Has the iron-clad ever exploded? Is there any danger of galvanic action between the two metals?"

Under date of September 15th, I received a note from Dr. B. T. Whitney, acknowledging the receipt of the communication, and, on the 22d, the following note, dated Buffalo, September 20th:

"In reply to yours of the 10th inst., asking information in regard to the strength of vulcanizers, and the best method of preventing accident from explosion, I may not be able to give you satisfactory answers to all your questions, but will cheerfully do what I can to impart to you any information I may possess upon so important a subject. I regret that the meeting of your society is not a week later, so that I might attend, as I could then make verbal answers to many questions, and explain points that I may fail to touch upon in writing. . . . The best answer I can give you as regards the thickness of copper used in the manufacture of our vulcanizers, is to send you two samples cut from the sheets we use. Sample No. 1* is what coppersmiths know as 33-pound sheets; of this

* This slip was the one-sixteenth of an inch thick; sample No. 2 a trifle thicker.

the upright or sides of the boiler are made; they, being cylindrical, are of great strength. No. 2 is from a 40-pound sheet, of which we now make the bottoms, as they, from their form, will not withstand so great a strain as the sides. No vulcanizer has been made by me of less than a 30-pound sheet.

"The corrosive action upon the copper is irregular, some spots being attacked much more vigorously than others. The water of different localities varies in purity, and also in its corrosive action. To illustrate the corrosion of copper, I send you a slip (sample No. 3*), being a vertical section from the side of a No. 2 Whitney vulcanizer, which furnishes a very good specimen of this action. This machine was sold in November, 1860, and returned for repairs (being absolutely *eaten through* at one side), July, 1868. The greatest corrosion took place at what was evidently the water line, about one-third the distance from the top of the boiler, cutting a groove about one inch in width around it, until finally, while vulcanizing, a hole opened in the side, letting off the steam as harmlessly as from a safety-valve. At this point the copper is no thicker than good writing-paper. The corrosive agent in the water, or which was produced in vulcanizing, floated, or was condensed, upon the surface of the water. The section I send you is cut from the opposite side of the boiler to the hole, and shows the copper thicker. We have not disturbed the thinner side, as we wish to keep it as a specimen. Had this machine been *neglected*, and steam allowed to run up to a high pressure just before its failure, an explosion would have been the result.

"A 'Hayes oven' was recently returned for repairs (a small leak in the side). Upon examination, a groove about one-fourth of an inch wide was found running around the inside, just above the packing ring. This oven would have exploded under a high pressure of steam. The Hayes oven is just as likely to burst from undue steam pressure as the boiler. It is just as perfectly filled with steam, the water in the plaster generating steam enough to fill so small a chamber; besides, it is advisable to use a little water when the oven is put together. Similar instances of the waste of copper might be multiplied indefinitely, but these two, with the samples, are enough for an illustration.

"As to the strength and testing of vulcanizers, I will say that every vulcanizer ever made by me, or Dr. Hayes, or the Buffalo Dental Manufacturing Company, has been thoroughly tested,—usually at a higher degree of heat than a dentist need use, and every one is *known* to be perfect before it is sent out. At the time I commenced making vulcan-

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* This specimen had evidently lost considerable from this action,—the inner surface was very much roughened, the average thickness the one-thirty-second of an inch, but a space about one inch wide was much less, in some places only the one-eightieth of an inch.

izers, there were no means at hand to test their full strength, except by the dangerous experiment of steam pressure. I gave the test of 250 pounds to the square inch, hydrostatic pressure, which was the highest any apparatus then in Buffalo would give. This is equal to 400° Fahrenheit. There was no more effect than from water in an open vessel. Experiments have been made, from time to time, in testing with steam up to 400°, without perceptible effect. There was no doubt as to their strength to withstand a much higher degree of pressure. This was the opinion of many practical engineers and machinists,—men of good judgment and information as to the character and strength of metals, and the expansive power of steam.

"We have recently, however, subjected a No. 2 Whitney vulcanizer to further tests, and can speak *positively* as to the extent of pressure they will bear. Under hydrostatic pressure up to 400 pounds there was no perceptible effect; 450 pounds gave some signs of strain, but not very decided; 500 pounds caused a slight bulging up of the top, (about one-eighth of an inch), but produced no perceptible effect on the boiler beyond a slight bulging of the bottom, and *forced water through the solid brass cap in globules*, but not through the copper. These tests can readily be made on any machine, old or new, as a test of strength.

"If you have the tables at hand, you can readily reduce these results to steam pressure and the corresponding temperature. What think you of the strength as shown by these tests? It must be borne in mind, however, that there is some loss in the strength of copper as the heat increases, but at the point of vulcanizing not enough to be of any great importance; at a higher heat it would be. Copper loses one-fourth of its strength at 500° Fahrenheit. So much for the strength as known by actual test.

"As to the *continuance* of the strength in use, I might name many cases as related by dentists who have subjected them to a high degree of heat. Dr. A. P. Southwick, of this city, is using a No. 2 Whitney vulcanizer over six years old. He has on several occasions found the mercury indicating over 400°, and once, when the thermometer would register 410°, he found the tube broken, from the expansion of the mercury it contained, without any perceptible effect upon the vulcanizer. The 400° seems to be a frequent occurrence with dentists in using vulcanizers. Dr. Charles Neal, of your city, some six or seven years ago, carried the heat in a No. 3 Whitney's machine until the boiler was stretched so that he could not use the round wrench,—I think the diameter was increased about half an inch, bulging irregularly, without causing any puncture. This bulging will often manifest itself before an explosion, but, under high pressure, the vulcanizer might give way without this warning. It is more generally seen in the bottom, in an increased

rounding up; sometimes the same effect is produced in the top. I have seen many vulcanizers that are still in use that have both the top and bottom bulged at least one-fourth of an inch. This fact induced us to use thicker copper for the bottoms, and to increase the thickness of the top.

"Almost every other article used in the arts or mechanics is expected to wear out, but dentists do not seem to think that vulcanizers will. We have always had, and still have, the utmost confidence in the strength of both the Whitney and Hayes vulcanizer; but we know they must wear out, and supposed we had given ample instruction and warning. Perhaps we might have spoken more freely and fully in the journals and the meetings of societies; but publishers, and those who are most influential in aiming to keep out of the societies those who are engaged in the manufacture of dental goods, would say that we were 'puffing,' or seeking notoriety.

"I can give no positive answer to your question as to the length of time vulcanizers may safely be used; there are so many things influencing their durability or destruction. In the first place, the care given them as to cleanliness, or in drying out after use—if kept in a foul condition and set aside wet, corrosion is continued, but if washed out and dried, it is arrested. Again, one operator may have his in almost constant use, while another uses his but seldom, as in the case cited by Dr. Hayes, where the dentist used his vulcanizer on an average of four times a day for eighteen months,—it would be a fair calculation to say *fifteen hundred times*,—when it had lost one-third its weight. This dentist continues to use up vulcanizers at the same rate, but never lets them go so far as to risk an explosion. There are many others who have had them in use for many years, but without any thought in regard to the risk they may be running, as there must be more or less deterioration in the copper.

"As to the best means of ascertaining their condition and strength, I will mention; careful inspection after removing any incrustation which there may be (the presence of which would indicate neglect and uncleanliness); looking for the depressions and roughened surface which always accompany corrosion, or any slight bulging at any point, carefully tapping on the outside with a small hammer, which will dent the weak places, if there are any, but will have no effect on parts of ordinary thickness; or resort to hydrostatic pressure if the apparatus is at hand, which can be done with ease and perfect safety. In the hands of a careful man and a close observer, a vulcanizer will continue to be safe at the ordinary temperature for vulcanization until signs of weakness are plainly manifest.

"I have no doubt that the explosions of vulcanizers that have occurred have been the result of carelessness on the part of the dentist, and that

no severe one has occurred at a degree of heat as low as 400°. All machines that I have seen after an explosion have shown every evidence of having been subjected to an unmerciful strain, the copper often being torn like cloth, and sometimes the fresh torn edges having been *blued* from the heat, a circumstance which would not occur at any reasonable temperature. In case a vulcanizer were so weakened as to give way at any reasonable vulcanizing temperature, a hole would open and let off the steam, as in the case of the machine from which sample No. 3 was cut, and no discoloration of the copper would take place.

"There is a lamentable degree of ignorance among those who are using vulcanizers as regards the character and expansive power of steam, and the strength of metals, as well as recklessness in their use. From the fact of their being steam-tight, and making no fuss like a whizzing, noisy engine, no danger is apprehended, though they may be subjected to many times the pressure of the boiler of any engine. The fact is, that at the ordinary temperature of vulcanizing, the pressure is fully up to the ordinary pressure of steam boilers, and the recklessness with which dentists subject their vulcanizers to three, four, or even five times this pressure, is sufficient to cause alarm in the mind of any person cognizant of the fact. From this cause there has been many amusing incidents, when the mind disconnects them from any thought of the danger incurred. Ideas of economy and convenience induce country and traveling dentists to use a cook-stove as a heating apparatus for vulcanizing. Several accidents have occurred from this cause. One man set his vulcanizer on the boiler-hole of the cook-stove while his wife was getting breakfast, and stepping outside to attend to some household duties, *forgot it;* an explosion eventually ensued, filling the kitchen with the fire, ashes, and fragments of the stove, *fortunately* without doing injury to any one. Others have been known to place their vulcanizers in a hard-coal fire, and even to bank the coal up clear to the top of the machine. A more foolhardy or reprehensible practice can scarcely be imagined.

"But generally the accidents occur by the operator leaving the machine to attend to a patient, or to some other business in which the mind becomes engaged, and the vulcanizer is forgotten

"A dentist in Canada once told his student to 'watch the vulcanizer,' without giving him any further instruction, although the young man had never been inside a laboratory before. He did 'watch it,'—until it blew up, and placed him in a position to 'see stars' in broad daylight.

"A dentist in Northern Pennsylvania, not knowing better, took his vulcanizer, a No. 3 Whitney, wrapped in towels under his arm, with the thermometer at 320°, and applied the wrench to open it; after two or three turns, a sudden separation took place, resulting in the dentist finding himself on the ground, and the set of teeth *non est.*

"There is also a lack of knowledge of the thermometer as an indicator of heat, and its construction and adaptation. Many suppose they are all alike, having no difference of range, and that any tube will fit any scale; not even reading the directions always sent out with every machine. We have taken great care as regards the accuracy of these instruments, and have given specific directions in regard to them, and yet dentists, and many of them of a good degree of intelligence, too, put in a new tube with the old scale, the 320 mark on the tube perhaps half an inch below the 320 figures on the scale, and then run the mercury up to the mark on the scale, supposing it to indicate 320, when it may be 400. How far this has been the practice I cannot say, but from the many orders and the large number of scales returned to us from dealers, we presume it to have been very largely so.

"When the thermometer bulb enters the steam-chamber, a solvent action is exerted upon the glass by the steam, through which it is gradually disintegrated, and in time it fails to register correctly. This does not occur with the mercury-bath thermometer, which we now use on all vulcanizers we make. The mercury is confined in the cup by rubber packing around the thermometer tube, and evaporates very slowly. The thermometer case should be occasionally unscrewed, and, if necessary, more mercury added; it will not need looking to oftener than once in a year or eighteen months.

"The fusible plug is a good safeguard when rightly managed, and renewed as directed in the envelope which accompanies the metal, but it is not reliable after long use, as the continued heat and action of the steam injures its fusibility. If the heat is carried high enough to cause small globules of the more fusible part of the alloy to stand on the surface of the plug, its value as a safeguard is very much diminished, and in a short time entirely destroyed. It should always be renewed after this has happened, and, occasionally, say once in six months, in any event.

"To obviate the annoyance and delay consequent upon the blowing out of the plug, notwithstanding its faithful warning, it has been the practice with very many to plug up the hole with a *rivet* or broken *excavator*. A Hayes oven, in this condition, has just been brought in, in a dangerous state from corrosion, and from a very intelligent dentist.

"A safety-valve would be but little if any more reliable than the fusible plug, as the valve is liable to get stuck down quite firmly unless it is carefully looked to and kept clean. Besides, it is impossible to keep it steam-tight; any leakage will interfere with vulcanization, and add greatly to the unpleasant odor of the vulcanizer.

"As to the best means of preventing accident, I need only say that more care and watchfulness in the use of vulcanizers, and more knowledge of the management of steam, are the only reliable means. No

achievements of human ingenuity have yet been able to obviate the effects of carelessness in the management of steam-boilers; and this is equally true as regards vulcanizers. It would be difficult to devise means of safety for the man who would light a fuse to a bomb-shell, and then carelessly go about his business, thinking that by-and-by he would go around and cut it off, in time to prevent an explosion.

"The steam-gauge would give no greater protection, as these accidents generally occur when the dentist is out of sight, in the office to see a patient 'just for a minute,' etc. Besides, they are a cumbersome and expensive appendage. Each time the machine is used a connection must be made between it and the gauge, and this connection must be kept steam-tight.

"Something to sound an alarm would be better; with this view, we are now getting up an 'alarm bell,' adapted to any of our vulcanizers, that will sound an alarm loud enough to be heard in an adjoining room when the mercury reaches 330°. There will be but a moment's time occupied in the adjustment, and it will not be in the way of handling the machine. The price ($1.50) will be so low that no dentist can make that an excuse; yet from the fact that a moment's time is required in their adjustment, I doubt if they will be much used. My partner, Dr. Hayes, has invented several devices, which, if rightly used, would go far toward procuring immunity from accident in the use of vulcanizers, but they are by no means so generally used as they should be,—it is 'too much trouble' to take any precaution. It is an old maxim, that 'familiarity breeds contempt,' and it seems to hold good in the frequent use of the vulcanizer. The operator has an utter disregard of danger. As I said before, the attachment of some signal to give an alarm of approaching danger, and more care and watchfulness, are the only safeguards we can name, especially in continuing the use of old vulcanizers. I can hardly believe it would be safe, as a general rule, to use a vulcanizer more than five years, yet such is the effect of care and cleanliness, that many employ one safely twice that time; but in a large practice, with the vulcanizer in frequent use, it would not be safe to use it half as long.

"The Hayes iron-clad is undoubtedly the strongest machine in use. However, the demand has generally been for copper, from the fact that vulcanizers made from it are lighter to handle and heat up more readily than the iron-clad. There is no galvanic action in the iron-clad, as there is no moisture between the metals. If a hole were eaten through the copper, the steam would escape between it and the iron shell, and give warning of the fact; we have never known one of them to explode. They have not yet been long enough in use to wear out, but undoubtedly they are less liable to this accident than the copper machines.

"Of all metals, we regard copper as best adapted for vulcanizers. For

the weight, it is the strongest of any available metal. It is as durable for this purpose as any other; it is more easily worked into form, and with less injury to its strength, than iron. In case of an accident, it does not fly into fragments like cast iron, or most other metals, but tears open, almost always leaving the whole of the copper in one piece, thus greatly diminishing the chance of injury to the operator or bystander. This fact explains why so few persons have been injured by the many explosions that have occurred. The case at Madison, Wisconsin, is the only fatal case of which I have heard.

"The only reason I can give for the larger number of explosions being of the Whitney machine, is that by far the larger proportion of all the vulcanizers now in use in America are of that pattern. From the simplicity of their construction, it may be that they are more likely to fall into the hands of a class of men who are not very careful. The two cases now most prominent before the public—those of Drs. Gish and Chittenden—though the vulcanizers were of the Whitney style, cannot be held up as examples; for, of the many explosions that have occurred, they have been of different makers; but few of them have been made public, as no serious accidents have before occurred.

"Yours truly,

"B. T. Whitney."

I have also received the following note from Dr. Hayes:

"Buffalo, N. Y., September 21, 1869.

"Dr. Trueman.

"Dear Sir,—Your letter to the B. D. M. Co. has been shown me, as also the reply of Dr. Whitney, in which I concur. There are a few points, however, upon which I desire to be more explicit. I do not know that my copper vulcanizers are more exempted from explosion than Dr. Whitney's, unless it be from the following reasons: My thermometer bulbs are protected from steam-pressure, which, in other machines, renders them unreliable after a few times using; after such exposure they may register 320° correctly, or they may be plus or minus many degrees, while the dentist remains entirely unsuspicious of his danger. I believe that most explosions occur from this cause, except in those cases of unmitigated carelessness where the dentist rivets up the safety-plug, or leaves his machine unattended by a competent assistant, or there are other like acts of temerity.

"I have never known of an explosion, even of an old, worn-out machine, which did not present *evidence* of having been exposed to more than double the vulcanizing strain. An oven used seven years, which only calipered $\frac{1}{30}$ of an inch, which we dared not test with steam at 320°, was subjected to hydrostatic pressure. At 200 pounds it was all right. At 300 pounds the tops bulged and assumed a spheroidal shape.

At 400 pounds water escaped in three streams between the three nuts. At 450 pounds a fine jet of spray was forced through the copper. At 320° this might have been safe, with careful usage, a long time, and yet I have never seen an exploded machine that appeared more frail. I think this shows that carelessness, or failure of the thermometer to register correctly, whereby the vulcanizer is subjected to an unknown strain, is the true cause—I believe in *all* cases. One of my new copper boilers was tested. At 400 pounds the copper changed shape, same as the Whitney machine, but while his cover bulged at 500, mine was in perfect order at 750 pounds; and subsequently, the same cover and screw collar on an iron-clad was subjected to a strain of 850 pounds to the square inch, when the pipes burst, the machine in no part having shown the least symptoms of over-strain.

"I will here answer your inquiry. Not one of the iron-clads, boiler or oven, has exploded to our knowledge. Nor has one even been returned for a new lining. While we know the copper machines lose about one-third in weight by fifteen hundred times heating, the iron-clad ought to stand twice or thrice the wear, and yet have twice the strength left to resist pressure that the copper boilers had when new. But this is not all; the ultimate safety of the iron-clad, oven or boiler, consists in the fact that the dentist cannot continue to use it after the copper is destroyed. The machine becomes useless, or else must be returned for repairs.

"There have been times when I would have given more to recall all of my copper machines than I received in profits from their sale. This feeling led to the invention of the iron-clad. But the majority of dentists care more for the sheen of a brass cover, or for the extra dollar which the iron-clad costs, than they do for immunity from danger—when they only see danger from a distance.

"Very respectfully,

"Geo. E. Hayes."

Had I been allowed a little more time to prepare this paper, I should have endeavored to obtain information from others in the same business; but when we remember that this firm manufactured a vast majority of all the vulcanizers in use in this country, these letters from two members of the firm, who have had an extensive experience in the business, and are both thoroughly practical men, are sufficient to show that they perfectly understand the danger attending the use of these machines, and from the tests they have made, produce an article fully able to stand all the strain really required of them. As Dr. Whitney remarks, it is utterly impossible to produce a mechanical device which shall, under all circumstances, shield men from the just penalties of their own carelessness. We may transfuse the vital current of the strong man to

the veins of the weak and feeble; but brains are of so delicate a nature, that they will not bear transplanting.

I can see no hope of immunity from accident for those men who have not enough brain, or energy, or ambition, or whatever else it may demand, to make themselves fully acquainted with the agents and agencies they are required to use in daily practice; or, having obtained this knowledge, neglect to use it. Especially, when the scientific literature of our own favored land has been so simplified and stripped of its technicalities; has been made so free and accessible, that none, however poor, can seek it in vain; none so illiterate but that with an honest effort they may successfully contend the race with fortune's favorites.

We cannot complain that the evil spirits we have to deal with are mysterious and unknown, for the subject of steam-pressure and boiler resistance has long occupied the attention of interested mechanics; and the laws regulating and bearing upon it have been so carefully and thoroughly studied, that in the hands of a careful and intelligent workman, it is perfectly safe. The dangers which for a long time threatened to destroy the usefulness of this agent have been so thoroughly fenced in by skillful and ingenious mechanism, that it is almost *impossible* for a *genuine* accident to occur. True, boiler explosions are still quite frequent—of almost daily occurrence, and will be so long as those having charge of them are so inexcusably careless. It is, indeed, strange how the constant association with danger makes men blind to its existence; and how readily they stroll off to seek amid the dreamy recesses of metaphysical reasoning the explanation of a disaster, while the true cause stares them in the face.

It would be, were it not so serious a matter, quite amusing to hear and read the fine-spun theories frequently advanced to account for these terrible calamities, so often the legitimate fruits of ignorance or inattention. Electricity, galvanism, chemistry, astronomy, and perhaps every other department or branch of physical science, in turn has been charged with exerting some mysterious and inexplicable evil influence over steam boilers. Many of you, no doubt, remember a so-called accident within a few squares of this place, where an engineer, astonished that the steam-gauge only registered *five pounds*, while his fires were but little below their usual height, not thinking of a *cock* he had a few minutes before turned, disconnecting both the gauge and safety-valve from the boiler, was, while busily engaged in getting up *more steam*, instantly hurled into eternity. And, again, the case of a fireman in charge of a steam fire-engine in the streets of New York, who, when the steam began to escape from the safety-valve, called for a rope, and deliberately tied it down with a clothes-line brought to him for the purpose; and in a few minutes, with a number of innocent by-standers, he was killed by the boiler exploding. It is, indeed, astonishing how perfectly reckless

some men become. I was informed by an engineer of a tug-boat on our river—a man of intelligence and experience whom I consulted in reference to the steam-gauge—that since the passage of the law requiring the lock-up safety-valve to be placed on all the boilers, it is not at all uncommon for those having charge of them to entirely disconnect the apparatus from the boiler by a *wooden plug* or *rubber diaphragm*, when they desire to run at a higher pressure than that fixed by the official inspector, taking care to rearrange things when preparing for his periodic visits; and this appliance, you will remember, was called into existence, and the law passed to enforce its use, by the universal *recklessness* of engineers overloading their boilers.

I merely mention these facts to show how perfectly useless it is to imagine that immunity from danger can be obtained by inventing *new safeguards*, while those who have life and limb in danger so persistently, determinedly refuse or neglect to use those they now have. What we have said in regard to steam-boilers is true in regard to vulcanizers; what we have said of engineers applies to those dentists who use them, who, for the time being, are in reality engineers in charge of steam-boilers. It is not more strength we want, not more metal, not more complicated appliance to constantly get out of order and become a source of annoyance and trouble, but a little more knowledge, a little more common sense, more discretion, care and caution, in the use of those we now have.

(To be continued.)

A WORD OF ADVICE.

BY CHARLES WOODNUTT, D.D S., SALEM, N. J.

A few plain words of direction to the young of our profession, whereby they may be guided on their road to the success which we all hope will crown our efforts, and which comparatively few of us ever attain, may not be amiss from one who has spent twelve years of his life in trying to gain what his imagination so brightly portrayed at the start.

After his education is completed, the young dentist, like the young of every other species, seeks a place to make a "local habitation and a name;" the habitation to be a good and comfortable one, and the name one of honor throughout all the land round about. And here let me say, there is not as much difference in locality as most persons suppose. It is true, there are some favored spots which seem to be just ripe and waiting to be plucked; but generally it is the *man*, and not the place, that makes the success.

After numerous prospecting tours, consultations with friends, and

mature consideration, the selection is made; and then come in a few rules, which, if adopted, and rigidly adhered to, will most certainly insure success, provided the operator is sufficiently skilled in his profession to compete with others with whom he may be brought in contact.

1st. Let your office be neat and inviting, in a pleasant neighborhood, if possible, and with no objectionable surroundings that would deter the most fastidious from visiting it. Then make your dress to correspond with your office,—be scrupulously clean and neat in dress and person. In the language of Shakspeare, "let thy dress be costly as thy purse can buy, but not expressed in fancy; neat, but not gaudy," and let all your office fixtures and appointments be of the same character. Cleanliness is said to be akin to godliness, and justly, too; I do not believe a filthy, slovenly man will ever be a good dentist until he reforms.

2d. Have good long office hours, especially in a country town, and *always* be there in business hours; let people understand you can be found in your office at all times, and it will go a great way toward establishing a reputation which will be of immense service to you, and put many a dollar in your pocket that would not otherwise find its way there.

3d. Strive to make each operation, of whatever kind, and without regard to present remuneration, better than the one that preceded it, and you will be surprised at the progress you will make toward perfection. I say without regard to present remuneration, for we are all too prone to slight an operation for which we are to receive a small fee. It requires a strong effort to bestow as much care upon a tin filling for a poor patient as we would upon a gold filling for a wealthy person; while the former would pay better for being well done, inasmuch as it fixes the habit of thoroughness in all our operations, and will make us more reputation, because poor people talk about these things more than rich ones.

4th. Associate only with the best men and women of your place. Your profession is an introduction to the best society; strive so to live that you will always be welcome there; strive for excellence in everything. Shun not only the vicious, but the gay and frivolous; show by your deportment that you mean *business*, and business only, in your office and office hours. In the early days of practice there will be many leisure moments; improve them all by reading the current literature of your profession, as well as its text-books, and by writing for its magazines anything of importance to the profession that may occur in your practice, or any new thing that may come to your knowledge, provided it is of sufficient value to be accorded a place in a respectable journal. Try to become a giver as well as a receiver of useful knowl-

edge; you will in this way be fitting yourself to take a higher place in the ranks of your profession as well as in the estimation of your patients. This latter is no small matter. The public is becoming better informed, and more discriminating than it was only a few years ago, and there is a higher standard of ability looked for and *required* now. This standard is being elevated every year, and it becomes each individual to contribute his mite toward so desirable an end.

Avoid everything that will render your breath impure or offensive; tobacco in any shape, and all alcoholic beverages, have this effect but most of all a combination of rum and tobacco. We have to do principally with delicate ladies, and nothing will send them on a voyage of discovery, for a dentist more congenial, quicker than the above odors. Never speak disparagingly of the operations of a professional brother; if you cannot speak well of them, say nothing. Let your works speak for *you;* if they are the best, the community will be certain to discover it eventually, and reward your modesty by bestowing their patronage upon you. "Learn to labor and to wait"—and the latter you will find the most trying thing you will have to do, unless you are endowed with more patience than usually falls to the lot of young men. But don't wait in idleness; acquire habits of industry; be doing something all the time, either study or some mechanical employment that will give dexterity to the fingers. Learn to make your own instruments, and invent new ones, or, if you prefer it, get a microscope, and with its aid make researches in any of the various fields opened up by this wonderful instrument, but more particularly in the direction of your profession. Follow this course and be assured of ultimate success.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

A SPECIAL meeting of the Society was held August 31st, 1869, to act upon the invitation to participate in the celebration of the centennial anniversary of the birth of F. H. Alexander von Humboldt.

The President, Prof. McQuillen, in the chair.

After stating that it was proposed to make this day one memorable by the people of all nations, mention was made of the intention of the German citizens of Philadelphia, and the invitation from them to the scientific bodies to attend and take part with them in the ceremonies of laying a corner-stone at the Fairmount Park, together with orations and concert at the Musical Fund Hall.

It was resolved that the Society should take part, under the same conditions that the Academy of Natural Sciences and other local scientific bodies had made.

Adjourned.

The Society held its first regular monthly meeting, after the summer adjournment, September 1st, 1869.

On being called to order by the President, the minutes of the previous meeting (June) were read and adopted.

Drs. Adolf Petermann, of Frankfort-a.-M., and Redigirt von Ad. Zur Nedden, of Nürnberg, Germany, were unanimously elected corresponding members.

Dr. Wm. H. Howard resigned the Recording Secretaryship, and Dr. Alonzo Boice was chosen, without opposition, to fill that office.

Dr. Eisenbrey, one of the representatives to the State Dental Society, reported the proceedings of that body with reference to the constitution, by-laws, lists of members and delegates of the Odontographic Society.

DENTAL INSTRUMENTS,

the subject for this evening's discussion, was then opened.

Dr. Stellwagen remarked that, aware of the absence of the regular essayist, that afternoon he had hastily thrown together a few notes, which would now be presented:

He who would be thorough as an operative dentist, must provide himself with proper instruments for exploring, scaling, excavating, filling and extracting, together with accessory apparatus.

Attention is invited to the last division but one of the above list, with the hope that by discussing the subject this branch, which has become a bugbear to the profession, may be shorn of the terrors and misgivings which from childhood have been associated with it, and from a more careful study of the instruments we may gain that which familiarity alone can impart.

We will premise that it will be unnecessary to enter into every detail, to explain the necessity that still occasionally exists for extraction, or to describe the care to be exercised in forming a diagnosis or effecting the operation; as the mere tyro must know, from individual experience, that in the preliminary examinations and preparations dentists are often tempted to act contrary to their better judgment, and, if not accede at once to the importunities of the patients, at least pass more hastily than is consistent with the importance of these steps, to the application of the forceps. It is no great matter of surprise that this is so, when it is remembered that the suffering seldom apply for relief until, exasperated by pain, they grasp at what appears to be the most certain and speedy cure. Blind to the value of their teeth, the majority of the class of people who permit them to become so badly diseased have not that regard for these organs which those better educated in this direction have; the only checks upon their impetuosity—namely, the fear of pain and dread of disfigurement—are generally removed by the confidence

so universally reposed in the power of anæsthetics to obtund the one and of mechanical substitutes to replace the other.

A case of extracting instruments cannot be considered perfect without a few scalers and explorers; while to these the scientific dentist would add such remedies as the creasote and morphia paste, the saturated solution of camphor in ether, or some other medicament to aid in calming patients which can sometimes be applied with great advantage before operating.

The thorough consideration of this class of instruments seems to have been so much neglected of late that, to excuse its notice here, it is perhaps well to refer to the long list of subjects that have recently been discussed before our dental associations, and observe how little attention this one seems to have elicited. Capping nerves, treating and filling are most worthy and deserving of study; yet but a few words will be sufficient to awaken us to see that the time has not yet come to lose sight of our actual position, no matter how unpleasant or humiliating it is, to be forced to acknowledge that the necessity still exists for the extracting case.

Careful diagnosis, investigation and treatment will not always save us from the reproach, to which the celebrated John Hunter recognized he was subjected, when he said, in his introductory to "Lectures on the Principles of Surgery," "This last part of surgery, namely, operations, is a reflection on the healing art; it is a tacit acknowledgment of the insufficiency of surgery. It is like an armed savage, who attempts to get that by force which a civilized man would get by stratagem." The teachings of this singularly learned man have great weight, even now, years after he has left us for a more perfect existence;—his remarks do not subject him to the charge either of ignorance, or insincerity, for thus expressing himself, while daily compelled to practice these very means of relief for suffering humanity. And his example should lead us, while endeavoring with laudable efforts to save the natural structures, at the same time to be prepared to perform our duty, when forced to admit our inability to cure.

We should ourselves be skillful in the performance of this dreaded operation, rather than permit those who confide themselves to our care to pass into the hands of charlatans, who abuse the use of anæsthetics, tear and mangle their unconscious victims; often robbing the mouth of organs whose perfection is so evident that no other motive would seem to exist for the commission of the crime than that it proves lucrative.

To those who prate of the interference to practice, by the loss of time over occasional patients, it is suggested that winking at sin will not avert its awards. Is it not payment enough to have the feeling that the manly course of meeting what we cannot cure gives us, rather than that arising in the breast after cravenly abandoning suffering mortals in

their hours of anguish to others, who may be less gentle, as they do not see what there was of fortitude, or heroism, before these were broken down by suffering? The mere extractor no doubt becomes accustomed to this work, and acts as if that which does not hurt him must be painless to others.

The extraction of teeth, with the proper instruments to accomplish the undertaking, is generally quite as simple as the ordinary dental operations; indeed, with skill and ambition to excel, the results will generally show a full average of successes. Many of the failures in this part of practice seem to be due to the mistake of having too few instruments to apply to the different shapes and sizes of teeth. It is the almost universal rule, that for excavating and filling our supply becomes overabundant; while, on the other hand, the use of forceps is growing so unpopular, that they are reluctantly resorted to; but few are employed, and these are often unfit for use, by reason of blood, rust, or imperfection of the beaks. It is true economy, in the management of a case of extracting instruments, to keep always ready for use a full assortment, to have preparations made to overcome, as far as possible, known impediments to success and promptly encounter every emergency with an expedient. We cannot reasonably expect a patient, with a half-extracted tooth, to contentedly await the time when a proper instrument can be obtained. Like Shakspeare's Macbeth, he feels,

> "If it were done, when 'tis done, then 'twere well it were done quickly."

Probably one of the greatest errors of the day, is the idea that prevails with some that great physical strength is requisite to accomplish the removal of teeth; yet all may recall that many failures are due to this false opinion, from the timidity and uncertainty of purpose it produces, as well as the unwonted force that is exerted in prehension. Much might be written on the crushing of the crowns of teeth, by the nervous energy with which the forceps are closed to prevent slipping, as well as the impossibility of gaining a solid grasp, with instruments illy adapted to the shapes of the teeth. The variation of contour and size of the portions of these organs above the jaw must be studied, and allowances made for them, as well as the direction or general appearance of the roots.

As near as I can remember, the largest human tooth I ever saw was some years ago in the possession of my preceptor, Dr. N. L. Dickey, of New Orleans. All who saw it considered it to be a curious and interesting specimen, meriting attention not only for its gigantic proportions, but for the odd history of its extraction, which, if my memory serves me right, was claimed to have been accomplished by a nun in Germany. It would prove strange indeed if, after all the boasted ability and strength of man, a woman should bear the palm of extracting the

most formidable looking tooth; even if there are, as there no doubt must be, others that equal it, we must not forget the main lesson taught, that

"The race is not to the swift, nor the battle to the strong."

After reading his paper, the writer exhibited the instruments he made use of, and, picking out the scalers, said the utility of this class was so generally acknowledged that anything he could say in their behalf would be supererogation.

They were of the ordinary two and three-edged patterns, of which he had some five kinds; to describe which, reference would be made to S. S. White's Dental Catalogue (1867), in which cuts representing approximately these instruments are found. For scaling, page 61, No. 8, a little straighter than the engraving; Nos 17 and 18, not quite so broad; No. 4, page 63; No. 4 and No. 1, page 60; the latter should be nearly straight, and a little broader; it can often be used for an elevator.

The explorers were very delicate, tapering instruments, some almost as fine as a hair, up to about No. 14, page 73, with the No. 4, page 63, of above. The temper of the fine instruments was drawn, they being soft enough in some instances to tie into a hard knot. With these, he mentioned that a syringe, mouth mirror, and foil pliers should be classed.

As lancets he preferred the ordinary gum and the short curved bistoury, like a sickle in shape, sharp on both edges, all of a high spring temper.

For extracting he often used the forefinger and thumb, guarded with a napkin, which also prevented slipping; of course these were, when unassisted, of but little or no avail where the teeth were crowded or firmly set; but the satisfaction given to the timid, where they could be used successfully, by thus avoiding the shock which steel so often gives, will more than repay for the attempt in favorable cases.

Next, the elevators are indispensable aids for the fingers, and the patterns shown were the scaler of page 60, No. 1, as modified, with page 47, Nos. 1, 2, 3, and 6; the two latter having a triangular file-cut, giving the ends a swallow-tail appearance.

He then called attention to the general contour of the forceps, they having been carefully manufactured for him, to order, of fine steel and temper. The joints that he preferred were what are catalogued as oval, and of the usual American pattern, riveted. He had two pairs of English instruments that had been presented to him while abroad, but he expressed himself as a little mistrustful of the peculiar joint the English manufacturers prefer, as it did not seem so firm, and he thought too much strain fell upon the screw that held the two halves together. The whole of the instruments, except where file-cut, should be highly polished, and without hooks on the handles, which seemed to be useless

and cumbersome impediments. They should of course be kept scrupulously clean.

He handed around some nineteen pairs, many of which were modifications of the plain incisor pattern. Four of these were selected as favorites, probably any one of which was more frequently used than all of the rest; yet he could not feel satisfied to be without the others, since there were times when they seemed almost indispensable. They were as follows:

The ordinary superior incisor forceps, p. 34, No. 13, which generally answered for all the sup. incisors, canines, and bicuspids, and sometimes for the lower; but to be prepared for those in the lower jaw, and in some cases of the superior teeth that presented inward toward the median line, he had to put in the No. 4, p. 35. For the upper molars, he liked forceps having one beak with three points, and the other beak plain, so that they may be used on either side; the handles straight; the lower molars, p. 40, No. 17, or p. 41, No. 47, Hutchinson's pattern.

To these he added, for the purpose of being prepared for all operations, the upper dentes sapientiæ, No. 10, p. 42; for either side, the straight, narrow forceps; for roots and crowded teeth, with longer beaks than No. 1, p. 29, the No. 7, p. 30, and No. 3, p. 29.

Three more incisor forceps, straight, but of different sized beaks, for different sized teeth. Upper molars, right and left, as No. 19, p. 37, and the cow-horn forceps, No. 20, p. 38, and No. 23, p. 40.

A pair of small inferior molar forceps for either side, which were of but little use excepting an occasional case in a child's mouth, when the readiness with which they could be hidden in the hand, or sleeve, to prevent unnecessary display, was a desideratum.

Finally, the two pairs of combined root, incising, separating and elevating forceps, as shown on p. 461 Dental Cosmos for September, where they are fully described, and the manipulations given in his own words.

Dr. Nones expressed his preference for heavy forceps that would hold solidly and without any giving way.

Dr. Long spoke of the use he had made of Dr. Flagg's modification of Physick's wisdom forceps, they having answered admirably.

Dr. McQuillen said that in the use of the Physick forceps great care should be exercised, as there was danger of the tooth being thrown out of the alveolus suddenly and getting into the throat.

Dr. Boice considered it very important that the inside of the beaks should be barbed and sharp, to enable them to take a better hold of the teeth.

Dr. Eisenbrey said his experience had been such that, with six pairs of forceps, he has been able to remove very difficult teeth of the different classes that have presented for such treatment. For the upper cen-

trals, cuspid and bicuspid, he gives the preference to the forceps that are so shaped as to allow the handles to clear the lower lip and teeth; for the want of such forceps, has had great difficulty in removing teeth when they incline very much in the mouth, as some do, without bruising the lip and otherwise giving unnecessary pain to the patient. For the wisdom teeth, both upper and lower, he prefers and uses a straight-handled instrument, with the beaks bent the same as a lower bicuspid forceps, and somewhat broader; a bicuspid forceps would answer just as well, with the exception of the narrow beaks, which would make them more difficult to adjust on the tooth. The advantage over other kinds is that, after it is introduced into the mouth, the patient can almost shut it there by relaxing all the muscles; then by *tactus eruditus* it can be adjusted and the tooth removed simply by closing the handles firmly, and rotating them outward and downward, if it is an upper tooth, or upward and outward, if it is an under one. If the crown surface of the tooth present to the cheek, we all know that it is almost impossible to grasp it with the ordinary wisdom forceps now in use, owing to the rigidity of the masseter and other muscles; but with the kind mentioned, and the mouth half closed, they are very easily worked on to the tooth, owing to the relaxed and yielding condition. If the crown is gone, take a heavy hatchet excavator, pass it up by the side of the root, and, using the alveolus as a fulcrum, it is easily turned out.

The Physick forceps he does not recognize at all. There are other instruments that will accomplish the same end, and that without requiring the presence of adjoining teeth to assist in removing them. There are cases where they work very well, but where the ramus overhangs the tooth and the twelve-year molar sets firmly against it, to use this forceps would be almost criminal practice, because either the adjoining tooth or the alveolus will be fractured. Physick's forceps are so easily used that, if we have them about, we are apt to use them when we should not. Very frequently we have no crowns to work on; the it is better to use a heavy excavator than those forceps, to cut through the gum and alveolus to turn out the tooth, as we would have to do.

The cutting forceps that Dr. Stellwagen has exhibited to us will do effectually all that he has represented them to, and that without wounding the parts to any great extent, or lacerating and crushing, as the ordinary alveolar forceps do, and the operation is less painful; besides, they do away with the very great unpleasantness and pain of pressing the beaks down between the gums and processes far enough to grasp the root securely for its removal. He has frequently had cases that called for such instruments.

Dr. Trueman thought the "thumb and finger," if well developed, made a very useful extempore forceps, but did not trust much to his own in extracting. He commenced practice with twenty pairs of forceps,

and thought he had only about half as many as he required, but now would be willing to part with all but seven. He had been very successful with the elevators, using two; one shaped (both the blade and handle) somewhat like an oyster knife, with a groove on one side, for front or conical roots; the other bent at an angle of 45°, and grooved, terminating in two sharp angles, with a large, round handle, for the back teeth. It requires a little practice to get the "knack" of using them, but when once acquired, they are very efficient instruments, especially if the operator is blessed with a good strong wrist.

Dr. Howard used eleven forceps of different styles, and thought much depended upon the familiarity of the operator with the patterns. He was very partial to a hoe-shaped elevator, with which he raked out stumps and roots, getting it back of and somewhat under those which he wished to extract.

Dr. McQuillen deemed it necessary to first break up the attachments of the teeth, and then extract; he did not think it required great strength so much as skill to perform the operation properly. A napkin laid over the lower teeth and lips was an excellent safeguard against wounding with the forceps or extracted tooth when drawn out suddenly.

Dr. Trueman called attention to the use of nitric acid for bleaching teeth, and exhibited two teeth (a central and lateral) in his own mouth, which several members remembered having seen when quite dark. They were now improved in appearance. They had been discolored many months, resisting all attempts to bleach them by the usual means, chloride of lime, oxalic acid, etc., when, in a course of experiments upon them, he used nitric acid, which restored the color almost *immediately*, not longer than thirty seconds being required to produce the change now so visible. They had remained filled (temporarily) with os artificiel some twelve or eighteen months without any change. He had since used it in several cases, with the same result, and felt that he could recommend it for trial; at the same time he would remark that it was a powerful remedy, and should be employed with extreme caution.

It is applied as follows: after preparing the cavity, and carefully filling the roots about half-way up, dry out perfectly, and apply *chemically pure nitric acid, undiluted*, by placing a pellet of cotton saturated with it inside the cavity (taking care to protect the lips of the patient with a properly disposed napkin), allowing it to remain until the desired change is produced. It may be necessary in some cases to repeat the "dose;" but with all he had treated, once had been sufficient. After removing the acid, rinse out well with tepid water, and bathe the cavity with aqua ammoniæ, or fill it with pulverized soda, so as to neutralize any acid that remains. To make sure of this, he had filled the cavity with the alkali, retaining it by a temporary filling, and allowed it to rest a week before proceeding any further; if all continued satisfactory, he cleaned out the cavity again and filled.

In applying the acid and alkali to the tooth, nothing but a gold or platina instrument should be used. *It is not safe to use a steel instrument while a vestige of acid remains*, or the small portion dissolved will combine with the tannin, always present, and make the tooth as black as ever. This he learned from experience in his own case. Although a powerful acid, it does not act so rapidly upon tooth structure as either the hydrochloric or acetic. He hoped the members would give it a trial, and report the result. The peculiar chemical action by which the bleaching was accomplished he could not explain, not having seen or heard any satisfactory explanation of why teeth discolor.

Adjourned, to meet October 6th, 1869.

A meeting was held on Wednesday, October 6th, 1869, at the Philadelphia Dental College.

The President in the chair.

W. Geo. Beers, of Toronto, Canada, editor of the *Canada Journal of Dental Science*, was unanimously elected a corresponding member.

Dr. Trueman read an essay on "The Dangers Attending the Use of Vulcanizers."*

At the close of Dr. Trueman's paper, much satisfaction was expressed at the care and labor with which the author had prepared it; a copy was asked of him for publication, and he was requested to continue his investigations, with a view of reporting any further results, at his own convenience, to some future meeting.

Dr. Neall stated that he had had in use, for several months past, a safety-valve (the mechanism of his assistant, Dr. W. H. Roop), such as are used on the boilers of steam-engines. It consists of a cap, or bolt, which is screwed into an opening on the head of the vulcanizer, a close-fitting valve, an upright, or fulcrum, and a graduated lever, with weight adjusted, so as to blow off at about 330° F. He has felt more confidence since its use, for, should the thermometer fail to register the degree of heat, the valve would, if the weight be properly placed, give timely warning of danger.

Dr. Barstow had, for some years, been using a pattern of a vulcanizer invented by Dr. Wildman, to which is attached Hayes' thermometer (large size); with these no accident had ever occurred to him

He never had a boiler to explode, but was sufficiently terrified on one occasion, when the steam packing blew out of a vulcanizer that he formerly used, sending the machine against the ceiling, bending the brass thermometer case, and consequently breaking the glass tube; the noise from the escaping steam was sufficient to be heard by his neighbors;

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* See page 561.

this escape of the packing was attributable to having a new piece of rubber, and the smooth, flat surface of the joint allowing it to slip, being different from most modern-made machines, which have a collar to prevent a similar mishap. He had not much confidence in the safety-valve attached to his machine; had known it to blow out before the thermometer indicated 320° F., while at other times a much higher degree was reached without producing a like result.

Dr. Nones thought the whole question resolved itself into one of care and precaution ; if all the safety apparatuses are unreliable, unless most closely watched, then we must devote that attention to the machines which they require, or give up altogether their use, unless we are indifferent to accidents. It will not do to leave the boilers, when vulcanizing, and expect them to be harmless.

Dr. Long, on one occasion, had his vulcanizer (a Whitney pattern) to blow out the fusible metal plug ; the cause of its being allowed to heat up so was the want of warning from the thermometer, which was found to have been broken.

Since the above experience he has employed a Franklin fusible gauge, which he thinks is safer and less liable to be put out of order than the thermometer. The two lower cups of the gauge are all that are required. He leaves an awl sticking in one, and when it melts this drops, thus making a noise that attracts his attention.

Dr. Breen had been using a Whitney vulcanizer for six years, and now felt an uncertainty about the length of time it would remain safe. He had always been careful, after using, to wash thoroughly, both inside and out, before putting it away. He gets new thermometers as the bulbs become faulty, so as to take all precautions. He once saw the thermometer up to 400°, but put out the gas and left suddenly, without making any further observations.

Dr. Tees had had but little experience, not having worked with these machines for nearly two years. He had always been cautious in vulcanizing; being careful not to allow the mercury to get above 320°.

Dr. Hewitt said the vulcanizer was nothing more nor less than a steam-boiler upon a small scale, but still demanding all the watching of a large apparatus while in use. Most of our boiler explosions are due to carelessness, or wanton recklessness, upon the part of the engineers, either from allowing the safety-apparatus to get out of order, or deliberate interference with their working.

There are occasional explosions where the cause can be traced to weak points in the boiler, as in the case of the steamer St. John's, of New York, where the cut of a chisel, used in caulking the boiler, seemed to have been the initial point at which the tearing of the plates began.

Dr. Eisenbrey thought that the only guard against danger we have, in the use of the vulcanizer, is a safety-valve ; for, after a certain pressure

is attained, the valve affords an outlet by which the confined steam can escape, thereby keeping it in a non-explosive condition. The valve is easily managed, simple of construction, readily repaired, and, above all, perfectly safe. Can we say the same of the thermometer? By no means. It is very unreliable, from the fact of its being so delicate and easily injured. We start the fire under the boiler with everything safe and sound, but we cannot say that it will be so to the end of the heating, when using the thermometer alone.

When the bulb gets fractured, as it very frequently does, it will not register properly. In such a case as this, the valve might prove a life-preserver. Engineers and manufacturers of steam-boilers place great reliance on the valve for safety, and generally attach two to a boiler. If a valve lets off steam before the thermometer is properly up, either it or the thermometer must be out of order; should the former be perfect, and steam escape before the thermometer is up, the latter is probably defective.

He has no doubt that we all have had the thermometers on our vulcanizers fail to raise as they should, after having a fire under the boiler for some time; and upon an examination for the cause, have found the bulb very much injured from frequent heatings, or by being carelessly put in the cup. Very few know the dangers that they have passed through, and escaped unscathed. He would have still more fears for safety in the use of fusible metal alone than in the use of the thermometer.

The valve and thermometer afford complete immunity from danger, and the two combined are what we want,—the latter for an indicator, and the former for a protector. If the thermometer gives out, or fails to register correctly, we are still guarded by the valve, which, if kept clean, is always reliable, while the thermometer may break and become useless during the process of vulcanizing.

Dr. Stellwagen had only used the vulcanizer to learn how to put up the work, some years ago, and could give no experience worth mentioning.

He called attention to the well-known condition of water, under pressure of steam, sometimes accumulating latent heat, which, upon the slightest agitation, by a jar or any means, would suddenly be liberated, exhibiting great force; to this might be due the rising of the thermometer after escape of steam, upon lifting the safety-valve, as mentioned by some present.

Again, the boiler might be carelessly put into the stand at an angle from the perpendicular, and, when but little water was in it, heated red-hot above the liquid. Then a shake from even walking over the floor might cause it to drop down into its proper upright position; thus the water could be brought into contact with the red-hot metal, and after

assuming the spheroidal shape for a few moments, the steam would generate so rapidly as to cause an explosion.

Steamboat boilers, it is said, generally explode just after leaving the wharves, from a similar cause, and those of steam-engines upon being put into motion after a rest, thus giving out the latent heat; the two causes of accidents mentioned were the most prolific, next to carelessness or defective construction.

Another reason assigned is, the pumping up of boilers—filling them to the red-hot plates; but this cannot be enumerated among the causes of explosions of dental vulcanizers.

He had been near a large boiler when it was suddenly emptied of both steam and water, through an immense hole torn in the steam-dome by a cannon shot; the pressure was almost instantaneously taken off of the water, and the whole contents must have been thrown into violent ebullition. The boiling water was ejected for many feet, scalding all unfortunate enough to be within its reach, several having the entire cuticle removed from their bodies, which made their deaths the most torturing he had ever seen.

This had taught him never to unscrew the head of a vulcanizer until the water was below 212° temperature; for, if not, there was danger of its exploding almost as violently as gunpowder. He would refer those wishing to study this subject to "Heat Considered as a Mode of Motion," by John Tyndall.

Dr. Tees spoke of a thin spot on one of the pieces of copper which was passed around, and asked if a similar place, when forced open, other portions of the vulcanizer being in a perfect condition, would not serve as an escape to the steam, and thus prevent an entire explosion.

Dr. Trueman said that the copper generally seemed to give way at such a point first; then, tearing and rolling up under the immense force, so large a rent would open as to produce the effect of an explosion.

Dr. Hewitt, in answer to a question, said that steam safety-valves were usually conical plugs, fitted by grinding, while hot, into a similar shaped opening. By this means unequal expansion and contraction were avoided; and besides, the conical shape prevented the plunger of the valve from being held down by the contracting of the metal around it.

Dr. Neall mentioned a new style of plate that he had seen in a patient's mouth. It had been made in Paris. He was not prepared this evening to describe it, but expected to do so at some future meeting.

Dr. Tees spoke of specimens of tortoise-shell plate which are in the Museum of the Philadelphia Dental College; he thought they must be very light, but liable to decomposition in the fluids of the mouth.

A specimen of a new style of collodion base, prepared by Dr. Brockway, of Albany, N. Y., was then exhibited, the manipulations with which were to be demonstrated at the college in a few days.

Dr. Long showed an ingenious gas jet, which enabled one to burn up all the carbon of our ordinary illuminating gas, and gave a flame free from smoke, fit for working wax, etc. The combustion was effected by admitting atmospheric air into the burner through four holes, in which place it mixed with the gas before escaping into the flame.

The essay for the next meeting, December 3d, it was decided, should be the "Past History of Capping Nerves."

Adjourned.

CHICAGO DENTAL SOCIETY.

The Chicago Dental Society held its regular quarterly meeting on Monday evening, October 4, 1869, the first Vice-President, Dr. E. D. Swaine, in the chair.

Dr. Marsh read a brief essay on "Treatment of Sensitive Dentine;" said that, though various topical remedies might often be used to great advantage, yet we often find that nothing but rapid cutting with an instrument, keen as a razor, will give us any assurance of success; was most favorable to the use of oxychloride of zinc; thinks topical treatment which may be indicated in one case would be utterly useless in another. Judgment, based upon experience, can alone guide us.

A vote of thanks was tendered the essayist.

Dr. Crouse thinks oxychloride of zinc decidedly the best thing to be used; but fears that in cases of nearly exposed pulps, death of this organ would follow such treatment; thinks that the good results obtained from its use as a temporary filling are owing to its non-conductive properties; sometimes has heard violent wedging advanced as proper treatment in preparing sensitive cavities; thinks this something like producing local anæsthesia by a blow upon the head for the purpose of extracting a few hairs.

Dr. Noyes related a case of a lower molar, of a female patient, in which he could find no signs of decay, yet it was very sensitive to sudden thermal changes; stated that the secretions of the mouth had an acid reaction; asked what should be done in such a case.

Dr. Crouse. Apply prepared chalk to counteract secretions.

Dr. Cushing thought that sometimes a thorough polishing of the tooth, or an application of creasote or carbolic acid and iodine, might prove efficient; finds good results in temporary fillings, in cases of acutely sensitive caries, with oxychloride of zinc. He related a case of a child who had very sensitive teeth, and whose mother entreated him to put something in her teeth to stop the pain, saying that her dentist always did to hers (the lady was from the East). He said he observed that some of the lady's teeth looked darker than others; and, upon further inquiry, the lady informed him her teeth were very liable to ulcerate

after they were filled. He thinks this the result of arsenic applied to obtund sensibility.

Dr. Stephens said he recently had a case where the patient was more nervous than the tooth sensitive. He commenced to excavate the cavity with a very keen instrument, and told the patient to say "stop" when he hurt; says he never stopped until the cavity was prepared, as the patient, in her nervousness, forgot to use the right word. He thought that this strategy was sometimes admissible.

Dr. Koch has used the rhigolene spray with advantage, in cases of sensitive caries, on the labio-cervical surfaces of canine, bicuspid, and incisor teeth. Several years ago he first assisted Dr. Kennicott in this operation. He applies the spray opposite the points of roots first, and then lets it reach the affected part gradually.

Dr. M. S. Dean used arsenic a great deal formerly, for obtunding sensitive dentine, with success; used dry arsenic in cervical cavities eighteen years ago; has seen some of these teeth since, uninjured; left the arsenic in from three to six hours; thinks os artificiel the best thing now in use. Some time ago he filled a very frail tooth, in which the pulp was exposed and bled, with os artificiel. This tooth very recently broke off, and the patient applied to have a pivot tooth inserted; upon examination, he found the pulp still alive. Any one doubting this statement, might examine it himself by calling at his office, at 2 o'clock on Thursday, as he then had an engagement to operate upon it.

Dr. Albaugh believes in rapid cutting with a very sharp instrument as the best treatment.

Dr. Freeman filled a right superior bicuspid with oxychloride where the pulp was somewhat exposed a year and a half ago; tooth very sensitive. He recently removed this filling; found the pulp still exposed and alive, but the tooth not sensitive. He capped again with oxychloride of zinc, and filled it permanently with gold.

CHARLES R. E. KOCH, *Secretary.*

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE second annual meeting of the American Academy of Dental Science was held in the rooms of the Suffolk District Medical Society, in Temple Place, Boston, Mass., the President, Daniel Harwood, M.D., in the chair. The following officers were elected for the ensuing year:

President.—Daniel Harwood, M.D.

Vice-President.—E. T. Wilson, M.D.

Secretary.—E. N. Harris, D.D.S.

Treasurer.—E. G. Tucker, M.D.

Librarian.—Dr. John Clough.

Board of Censors.—Drs. E. G. Tucker, D. M. Parker, and J. L. Williams.

Dr. Edward Gage, of Paris, was elected an associate member of the Academy.

Dr. J. H. Foster, of New York, was chosen to deliver the next annual address, and Dr. E. T. Wilson as substitute.

A paper was read by Dr. E. T. Wilson, discussing the dental profession in a general way. The system of advertising was sharply attacked, the speaker declaring that science and puffery were seldom found in each other's company. Quackery was satirized, and a disposition to use scientific discoveries for selfish purposes severely condemned.

The annual address was delivered by Dr. Harwood. The speaker briefly discussed the qualities necessary for a dentist or a candidate for the dental profession. Such a man, he said, should have vigorous health and a sound constitution; a sound and well-balanced mind; cultivated manners; elegant tastes; an almost indomitable will; industry and persistency, coupled with natural ingenuity of the inventive kind; a liberal share of the qualities of the sculptor, to restore the sunken face of a patient to its former lines; good, trusty hands, to work out the will; and lastly, a high sense of honor, and a moral character without a stain and above suspicion. A dentist also needed a practical knowledge of stucco-working; of the mystery of porcelain manufacture; of gold and vulcanite working; of cutlery, as some of the most delicate and useful of dental instruments must be made by the dentist himself; and last, and most important, a thorough medical education.

After the delivery of the address, the Academy adjourned for the annual dinner, at the Parker House, which closed the anniversary.

BRADFORD AND SUSQUEHANNA COUNTY DENTAL SOCIETY.

This Society held its third semi-annual session at Montrose, Pa., September 14, 1869. Dr. C. S. Dusenberry was chosen President for the ensuing year, and N. B. Smith, Secretary.

Essays were read by the President on the relation which the dental profession do and should sustain to the public; by Dr. Kelly, of Towanda, on "Mechanical Dentistry;" both replete with valuable information.

The first subject of discussion was, "Treatment of Exposed Pulps," in which Drs. H. Weston and Kelly of Towanda, J. K. Newell of Wyalusing, and several others, participated.

By request, Dr. W. W. Smith, of Montrose, gave his method, in detail, of devitalizing pulps, subsequent treatment, and final filling of the teeth.

Dr. Kelly stated that he now, almost invariably, saved the pulps alive; first by treatment, then capping with os artificiel, and afterwards by filling in a permanent and durable manner.

Drs. Smith and Newell also stated that they had pursued the same course for several years, with the most satisfactory results.

Finishing gold fillings, sensitive dentine, care and treatment of temporary teeth, mechanical dentistry, etc., received each a share of attention, and much valuable information was elicited.

Rubber as a base for artificial dentures was condemned by all; and the resolution adopted at a former meeting of the Society, of discarding it altogether, was reaffirmed; and, inasmuch as nearly all present had adopted aluminium and "Weston's Metal" in lieu of rubber, Dr. Dusenberry offered the following, as the sense of the meeting, which was adopted:

"That the members of this Society express themselves as more than pleased with the use of Weston's Metal in place of rubber, and feel themselves under lasting obligations to Dr. Weston in enabling them to throw off the oppressive yoke of the Rubber Company."

Adjourned to meet at Wyalusing, the first Tuesday of June next, 1870. N. B. SMITH, *Secretary.*

BROOKLYN DENTAL SOCIETY.

THE second annual meeting of the Brooklyn Dental Society was held on Monday evening, October 4, 1869, at the residence of Dr. C. D. Cook. Officers were elected for the ensuing year as follows:

President.—Dr. O. E. Hill.

Vice-President.—Dr. M. E. Elmendorf.

Recording Secretary.—Dr. E. L. Childs.

Corresponding Secretary.—Dr. A. H. Brockway.

Treasurer.—Dr. I. C. Monroe.

The reading of the various reports showed the Society to be in a flourishing condition. It has undertaken to establish a dental infirmary in Brooklyn, independent of any other institution, where dental services will be given to the poor gratuitously, and where dentists and students can witness dental clinics.

The Society numbers about fifty. It was organized in December, 1867, as the Brooklyn Society of Dental Science and Arts, but during the past year the name was changed to its present one, and it has become an incorporated institution under the laws of the State of New York. E. L. CHILDS, *Recording Secretary.*

ALABAMA STATE DENTAL SOCIETY.

THE dentists of the State of Alabama assembled in Montgomery, October 6th, for the purpose of organizing a society. An election for officers resulted as follows:

President.—Dr. J. G. McAuley.

First Vice-President.—Dr. S. Rambeau.

Second Vice-President.—Dr. Evans.

Secretary.—Dr. Rees.

The constitution and by-laws adopted by the Tennessee Dental Convention were, with a few alterations, adopted.

At the evening session of the last day the time was spent in discussion on the treatment of devitalized teeth.

Adjourned to meet in Selma, the third Wednesday in August, 1870.

A. H. C. WALKER.

PUBLISHER'S NOTICE—PREMIUM.

A Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts. By James E. Garretson, M.D., D.D.S., Late Lecturer on Anatomy and Surgery in the Philadelphia School of Anatomy; Late Professor of the Principles and Practice of Surgery in the Philadelphia Dental College, etc. Illustrated with Steel Plates and numerous Wood-cuts. In one volume, octavo, 700 pages. Fine toned paper. Handsomely bound in cloth. Price $7.50.

Desirous of extending the circulation of the DENTAL COSMOS, we offer as an inducement to solicit subscriptions, a copy of the above volume, postage pre-paid, to any one who will send us a club of six *new* subscribers for one year, accompanied by the cash for the full amount of the subscriptions—viz., $15.00.

SELECTIONS.

ON THE PAIN OF PARTURITION, AND ANÆSTHETICS IN OBSTETRIC PRACTICE.

BY A. ERNEST SANSOM, M D., LOND., M.R.C.P.,

PHYSICIAN TO THE ROYAL HOSPITAL FOR DISEASES OF THE CHEST; HON. SEC. MEDICAL SOCIETY OF LONDON.

"MORE than ten years ago observation led me to the opinion that the commonly received notion that anæsthetics primarily affected the brain and nervous system was erroneous. Dr. Snow had previously attacked the validity of the doctrine of the determination to the brain by the summing up of his conclusions with the phrase, 'Narcotism is suspended oxygenation.' A further elucidation of this was made, in 1856, by Dr. George Harley, who proved, by comparative experiments, that anæsthetics arrest the oxidation of the blood, even when

removed from the body. I made a large number of experiments on the influence of anæsthetics upon the blood and upon the circulation, and in a paper read before the Medico-Chirurgical Society, in 1861, and a communication to Dr. Beale's Archives of Medicine, No. vii., 1861, I enunciated the doctrine that anæsthetics operate indirectly by suspension of oxygenation, and directly by action upon the blood and upon the forces of circulation. This doctrine I have discussed in detail in my book on Chloroform. Subversive of our former views as to the action of anæsthetics, I could not expect that this theory should be at once received, and in the reviews which have appeared both in this country and America I find that it is not yet admitted as the correct explanation of the phenomena of narcosis. In the *American Journal of the Medical Sciences*, however, the reviewer does me the high compliment of calling mine the physico-chemical theory—a compliment, because in my opinion it is precisely in so far as a theory can, by physico-chemical means, explain the phenomena of Biology, that it will stand the test which the progress of science applied to it.

"It is chiefly because I am convinced that this theory affords the best answer to the *practical* problems of anæsthesia, that I bring it before the Society, and, as evidence in its favor, it is no small consequence to me to have this written testimony of Dr. Beale: 'I have no doubt your view of narcotism is true. It accords with the inferences arrived at from so many kinds of observations.'

"I will not stay to inquire whether anæsthetics act by absorption into the blood. Every one, I think, now agrees that they do thus act. It is scientifically proved that the agent, in its circulation through the system, suffers no chemical change. Chloroform circulates *as chloroform.*

"This attained, how do anæsthetics proceed in their action? Do they directly attack the nerves and nerve-centres? If this could be answered in the affirmative, there would be little need to inquire further. The latest writers on the action of medicines (except always Dr. Bence Jones) and those who embrace the theory of Messrs. Lallemand, Perrin, and Duroy, adopt this view, but it is surely no unfair criticism to say that those who adopt it admit that, so far as narcosis is concerned, 'all that we know is, nothing can be known.'

"We will, in our investigation, start from facts which have been actually established. According to Dr. Snow's careful computations, it requires only twenty-four minims of chloroform circulating in the mass of the blood to induce the most profound narcotism; it follows that the effects known as narcosis are due to the circulation of the agent employed in a state of extreme dilution. What effects would a solution of such tenuity have on the nerves and nerve-centres of sensation? Direct experiment says none, for not only this but a concentrated anæsthetic applied to these structures induces no signs of anæsthesia. But it may be said that there is some molecular union accomplished through the vital force between the anæsthetic on the one hand and the particles of the nerve acted upon on the other. This is the only feasible basis on which the hypothesis of the action of anæsthetics on brain matter *can* rest; and what evidence is there to support it? Of course we know that lesions of the central nerve-structures produce symptoms identical with those of narcotism; but in such cases the lesions are to be detected by physical examination. Moreover, in the coma induced by

the alkaloids we discover congestions and effusions which we can trace to a causative relation with the symptoms. But what is the case in the narcosis induced by chloroform? The brain is found to be pallid rather than injected, and no physical lesion is to be discovered.

"The action of alkaloids would certainly lend countenance to those who hold to the theory of direct action; but the physical conditions are very different from those which obtain in the case of chloroform. By a new and perverted nutrition, certain organs become modified by a body that cripples their functions. So strychnine will influence the medulla oblongata, veratrine the heart, curare the muscles; but, by a process of nutrition, they are absorbed, and, by a process of excretion, eliminated. *If there is this intimate union between chloroform and nerve-molecules, why do the effects of the former so readily pass off?* Furthermore, it is wholly unnecessary that we should presuppose that a primary implication of the nerve-centres is necessary for the manifestation of the phenomena of narcosis. For we know that these occur in apnœa, in which no direct toxic agent is concerned, and an identical state is induced by agents which no one suspects of a direct action on nerve matter; by carbonic oxide, which spoils and destroys the blood-globules; by carbonic acid, which arrests the oxidation of blood by the physical effects of its presence; and by other gases which interfere with the due aeration of the blood.

"I have now shown the difficulties which lie in the way of our reconciling with the current ideas a sufficient explanation of the phenomena of anæsthesia. My plan of argument does not render it necessary that the latter should be *proved* to be untenable. My objections may be counted pungent, but not fatal; but if, after showing the stumbling-blocks in our way, I can by another theory abolish discrepancies and incongruities, and can explain signs which have remained unexplained before, I shall make a step toward an expression of the most attainable truth. Having thus shown what anæsthesia is not, I shall endeavor to show with what certainty I can what it is.

"'Narcotism is suspended oxygenation.' This dictum is the keystone of the theory which explains the action of the most dissimilar narcotics. The oxygenation of the blood suspended, the molecular integrity of the tissues is interfered with; there becomes, as Dr. Richardson has put it, 'inertia of the molecules;' but neither of these phrases explains the *ultima ratio.* The question yet remains, How do anæsthetics induce this suspension of oxygenation?

"In the cases of all the anæsthetic agents with which we are acquainted, the first manifest effect is upon the circulation of the blood. The heart-beats increase in frequency and in force. This fact is proved as well by actual experiment as by common observation. I have also proved that a primary effect of anæsthetics is, besides an increase in the rapidity of the flow of blood, a contraction of minute systemic arteries.

"It is evident, therefore, that anæsthetics at the early stage of their action are excitants of the cardiac and vaso-motor nerves. I need not stop to state the intimate relation which must subsist between the absorbed anæsthetic and those nerve-structures which Dr. Beale's researches have shown to ramify amid the ultimate structures of the vascular network.

"From these causes, which concur to produce an increased impulsion

of arterial blood, a secondary effect is produced, which I believe has much to do with the superinduction of the state of anæsthesia; an injection of the venous capillaries, a forcing onward of the blood into the venous channels, and hence *a disturbance of the normal relations subsisting between the arterial and venous system.*

"If we pursue our investigations further, we find that, after the stage in which there is increased activity, if the flow in the arteries has persisted for some time (that time varying with different anæsthetics), an opposite condition is induced; the heart beats with diminished force, the flow is seen to be pulsatile, the arterial walls become relaxed, and the blood moves with a slow and toiling current. This, however, is not an essential condition of anæsthesia. Anæsthesia in many cases exists while the arteries are yet contracted.

"We come now to these important points: that anæsthetics vary in their action upon the forces of the circulation; that in the cases of alcohol, ether, and especially tetrachloride of carbon, complete anæsthesia occurs, and persists while the afferent blood-vessels are contracted; but that chloroform has the power of producing paralysis of the vaso-motor influences much more rapidly than the other agents; *and that in direct proportion to the concentration of its vapor.*

"And now we become able to explain the apparent paradox of the varying post-mortem appearances in cases of death from various anæsthetics. Alcohol, ether, and tetrachloride of carbon cause a prolonged stimulation of the cardiac and vaso-motor forces; the consequence is, an urging onward of the blood toward the venous channels: thus the venous system becomes loaded, the respirations are enfeebled, death partakes of the form of apnœa, and after death are found turgidity of the veins, accumulation in the sinuses of the cranium, and distention of the right side of the heart with a blackened blood.

"In case of chloroform it is otherwise; its stimulant action is more transient, it may quickly superinduce paralysis of the circulating forces, and that in an inverse proportion to the dilution of its vapor with air. Freely diluted, its stimulant action is prolonged; but concentrated, it is evident that the vapor becomes a rapid paralyzer of the sympathetic, and the post-mortem signs are exactly those of syncope.

"By an argument which I fear has proved wearisome, I have now arrived at a point which I wish strongly to place before you.

"The usual course in investigations on anæsthetics has been to analyze the results of practice and common observation, to build up opinions upon opinions, and to promulgate doctrines *solely* on the basis of actual experience. By such means I acknowledge that results of the highest value have been arrived at. But in this paper I have reversed the process. My aim has been to establish by experiment and analogical observations a sound pathology, which I believe to be the only standpoint for a sound therapeutics. We can thus test the fallibilities of theory by the test of experience and the fallibilities of experience (for these in biology are undoubted) by the test of theory. The point, then, on which I wish to insist is this: that theory and practice, experiment and experience, combine with the records of actual cases in the past to prove that strong atmospheres of chloroform suddenly paralyze the motor influences of the circulation, while dilute atmospheres act with a comparative benignity.

"Concurrently with the action of anæsthetics on the motor powers of

the circulation, they possess an influence upon the blood itself. This influence is proved (1) by Dr. George Harley's experiments detailed in the *Philosophical Transactions;* (2) by my observations on the change in form and integrity of the blood-corpuscles induced by the several anæsthetic agents; (3) by the alterations in the color of the blood which have been noted; (4) by the argument from analogy which states that carbonic acid and carbonic oxide, both of them agents which induce narcotism, act powerfully upon the blood-corpuscles.

"The conclusion appears to be, that though all anæsthetics tend to impair the integrity of the blood, and to cripple its physico-chemical properties, they do so to different degrees and in different ways—some, as ether and carbonic acid, distending them; others, as carbonic oxide, emptying them. The cause, therefore, is various, but the effect the same, viz., disturbance of those normal changes in the blood essential to perfect life.

"Time will not permit me to investigate the other concurring causes of the state known as anæsthesia. I hope I have proved that the doctrine which asserts that anæsthetics act in virtue of an electric affinity for the brain is an assertion unconfirmed by a single proof; but that the correct explanation of their action is, that they, being absorbed and projected throughout the system, act by modifying the state of the circulation, and by suspending by the physical effects of their presence the vital endowments of the blood. Their chief danger is, that they shall produce a paralysis upon the circulating powers; but this danger, by the choice of proper agents, can be averted.

"The course of our investigation, then, this evening, has led to two conclusions—one, that to relieve the pains of natural labor only, small doses and the early influences of an anæsthetic are necessary; and the other, that these conditions can be fulfilled with no depression, but with even an exaltation of the forces of the circulation."

ELECTROLYSIS IN THE MOUTH.

BY W. K. BRIDGMAN, L.D.S.

Being the substance of a paper read before the Physiological Section of the British Association at the meeting held in Norwich, August, 1868.

"About six years since, a gold medal was offered to competition, through the Council of the Odontological Society of Great Britain, by Mr. Tomes, for the best essay 'On the Pathology of Dental Caries,' which I had the honor to obtain.

"The essay, when sent in, was accompanied by a series of preparations, exhibiting the characteristic features of decay in the teeth, artificially produced by voltaic electricity, together with illustrations of tartar produced by the same agent, and various examples of galvanic action upon albumen and other organic bodies.

"In awarding the medal, the President expressed his conviction from the experiments, at the same time observing, with regard to the electrolytic theory then advanced for the first time, that he was 'not in a position to dwell upon its merit, because there is so much new matter

in it, and many of the points (being of novel application) we are, perhaps, hardly up to.'*

"The principle of electrolysis belonging to the science of Physics rather than to Physiology, and not entering into the ordinary course of study for the dental practitioner, thus being not comprehended, the theory has consequently been unappreciated, and has remained altogether unrecognized by the profession. The experimental results, although accepted as being so far satisfactory as regards the corresponding appearances produced, were necessarily obtained from materials *out of the mouth,* and such as are deemed to be dead substances, or substances that are supposed to have lost vitality, and hence to present different conditions to those *in situ*, and therefore to be influenced in a way which would not affect a living body. Hence it became necessary to obtain some corroborative proof of the possibility of the occurrence taking place during life. Such an instance of electrolytic action upon the living teeth, most fully substantiating the position assumed in the prize essay, has at length been found in so prominent a form as to be unmistakable.

"In rectifying malpositions of the teeth, a ligature of hard and elastic silk twist is often made use of, and it was under the application of this treatment that the effect in question was produced. A ligature having been placed upon the upper incisors, and allowed to remain for several days, was being removed for renewal when a small round hole was detected, composed of a semicircular groove in the edge of each adjoining tooth, and presenting the appearance of having been drilled or filed into shape, so perfect was it in outline. On closer inspection it was found that the twist had formed a semicircular groove in the enamel of each tooth along its entire course, as if the silk had eaten its way into the crystalline mass wherever it had been in contact with it.

"On appealing to the ligature itself, which had just been removed, it was found to be rigid, crisp, and rough to the touch. Under the microscope it was seen to be thickly incrusted with a transparent crystalline deposit, by which all its fibres were matted together. A portion of this ligature, crushed flat between two pieces of glass, and placed by the side of a portion of the twist in its unused state, shows very clearly by its strong contrast of whiteness the change it has undergone.

"Now, had there been no evidence beyond the mere grooving of the tooth, the precise mode of action might have seemed open to question, but the fact of the presence of the lime salts, which have been dissolved out from the enamel and recrystallized upon the fibres of the silk, places its electrolytic character on an indisputable basis, as will be at once seen by referring it to the ordinary form of electrolysis.†

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* British Journal of Dental Science, vol. vi. p. 281.

† In experimenting with various substances in order to find out a voltaic combination that would afford a parallel case to the silk twist, I had the satisfaction of hitting upon an arrangement which not only illustrates this most completely, clearly showing why such an effect was produced in this particular instance, and not as a regular occurrence in all cases of similar application, but also tends to clear up many hitherto obscure points; such, for instance, as the reason that tartar accumulates in some mouths and not in others; why certain teeth are prone to decay more in some dentures than in all; and especially exemplifies the cause of the peculiar affection of the necks of the teeth, and the decay at the external basial area, which tends to separate the crown in time from its root or roots. This, however, is too lengthy to be incorporated with the present paper, and, therefore, will appear soon in a separate form.

"The term electrolysis was introduced by Faraday to denote the breaking up of, or separation of, the elements of a substance when forming part of an electric circuit, the 'electrolyte' being the substance so acted upon. Thus, in a common battery of zinc, platinized silver, and dilute sulphuric acid, the water constitutes the electrolyte and has its elements repolarized and separated—the oxygen going to the zinc or positive element, while the hydrogen passes to the silver or negative element of the battery, the use of the acid being to dissolve the oxide of zinc formed by the union of the oxygen with the metallic zinc, so that a clean surface of the metal shall be constantly retained for being acted upon by successive portions of oxygen, and thus keep up a regular degree of constancy in the action of the battery. When salts of lime, or any other of the alkaline earths, are dissolved in the electrolyte, these are transferred with the hydrogen *to the negative.* Here they are either crystallized or thrown down as a soft and spongy mass in proportion to the quantity or intensity of the electricity used, or the slowness or rapidity of the action induced. A portion of saliva placed in an electric circuit has its lime salt thus precipitated on to whatever substance may be used as the negative pole. This electrolytic power, however, is not confined to salts in solution only. Solids that are hard and only infinitesimally soluble are acted upon in the same manner. The substance becomes temporarily dissolved, then passed on to the negative pole, where it is again precipitated in its altered form. Hence, a slice of ivory or dentine placed under the two platinum poles from a small battery resting upon it at some little distance apart, has the lime abstracted from under and around the positive pole and transferred to the negative, upon which it becomes incrusted, just as we have the lime salts crystallized upon the silk now in question.

"This decalcifying process, by which lime salts are abstracted and transported to another locality, constitutes the most prominent feature pertaining to dental caries as it occurs in the mouth. The decalcified substance of the tooth becomes soft and translucent, and shrinks in drying. The same occurs with artificially decalcified dentine, as may be seen by the shrunken spot upon which the positive pole had rested.

"We have next to consider the oxygen effects resulting at the positive element. Combining in certain proportions, the oxygen first forms an oxide, but in larger doses it produces an acid. Thus, in decalcifying dentine, as in the above experiment, we find the decalcified spot, when tested with blue litmus paper, strongly acid. The same thing occurs in ordinary decay; the substance removed from a carious tooth in an active state of decay is invariably intensely acid. In the case of the silk, immediately the groove was detected and the cause of its formation recognized, a piece of litmus paper was pressed firmly upon the indented portion, and when removed exhibited a bright red line wherever it had come in contact with the abraded surface, so that we have thus a perfect correspondence of results in the two principal features—that is, first, in the removal of the lime, and next in the production of acidity in the remaining tissue.

"The presence of this acid has been the stumbling-block in the path of theorists. The most seemingly plausible, but at the same time the most superficial and unphilosophical theory hitherto advanced, attributes the formation of it to the decomposition of putrescent food lodged in the crevices and interstices of the teeth; a very slight degree of attention,

however, would show that decay often arises where no such lodgment could possibly occur, while, were such the procedure, the action of the acid would be detectable upon the surface of the enamel at the first commencement of the process, but which is not the ordinary effect observable. On the other hand, decaying teeth are mostly accompanied by a deposit, more or less, of tartar, and which, were the acid formed externally, would be the first to be dissolved, and *its* solution, instead of the free acid, would be the saturating medium.

"That tartar can, as generally supposed, be only a precipitate from the saliva, accumulating by ordinary subsidence, is entirely refuted by two of its attendant circumstances. First, by its often hard and sometimes semi-crystalline character; next by its preference for certain parts of the tooth over others, and its adhering most tenaciously to *upright surfaces*, contrary to the laws of gravitation—facts which clearly indicate the existence of some elective and attracting agency in addition to the cause of its separation from the saliva, such as we see in electrolysis.

"The very singular fact that tartar invariably commences to accumulate upon and around the necks of the teeth, under the free edge of the gum, points to a very significant feature in the economy of the tooth. It has been abundantly proved by experiment that to be capable of receiving an electro-deposit of lime, the part must possess *negative* electricity, or, in other words, must be an electro-*negative*. It has further been shown that to undergo decalcification the part must be an electro-*positive*. Hence, as the *crown* of the tooth decays while the tartar accumulates at the neck, we infer these parts to be respectively positive and negative, which is a division that will be found to be borne out by the different circumstances under which each part is formed during the period of growth. All that portion of the tooth which rests upon the pulp to the edge of the enamel is first formed by a thickening of the epithelial surface of the gum, which, again, is but an extension of the cuticle of the skin. This part first attains its full growth as a soft substance and then becomes hardened subsequently, gradually increasing from the outside to the centre. When fully hardened, it still retains its connection as a continuation of the epidermal layer, but now the root begins to form by an entirely different process: instead of attaining its full growth as a *soft substance*, as the crown does, it elongates by successive layers of soft and hard materials, deposited simultaneously, or nearly so, and thus gradually elevates the crown above the gums. Although no difference of structure may be apparent when examined microscopically, the subsequent behavior determines the polar condition of the tooth to be an effective one.

"The fact of this polar condition of the tooth being established, it remains to be seen in what manner the earliest stage or starting-point in decay may arise. The great John Hunter remarked that there appeared to be two kinds of decay: one hard, dry, and discolored; the other soft, and rapidly extending, with little or no discoloration. The first may be characterized merely as eremacausis, or slow combustion, in which the gaseous elements have escaped and left the carbon in the form of charcoal. We commonly see a black spot as the forerunner of further decay. Charcoal, like the silk, is an electro-negative, and, as soon as it becomes sufficiently soft to imbibe moisture, it acts precisely in the same manner by decalcifying the spot of dentine surrounding it. In the Bunsen and bichromate of potash batteries carbon is employed as

the negative element, and found to be very effective. This charcoal, however, is not an indispensable agent in decay ; polarity is induced by a want of homogeneity ; thus, if a plate of pure zinc be immersed in dilute sulphuric acid, no action will take place between them ; but if the zinc contain impurities, *or one part be more dense than another*, negative centres will be set up, around which decomposition will immediately commence. Where teeth have been crushed together by lateral pressure, or have grazed against each other in their extrusion from the gums, a bruise results to one or both of them, which then becomes a non-homogeneous centre, from which decay is sure to arise sooner or later. Or this want of homogeneity may arise during the period of growth, through an unequal rate of progression, or in connection with some affection of the skin at the time of formation, and so become the constitutional or predisposing cause of decay.

"In the reparative treatment of the teeth, it is well understood that, with the first stage or dry decay, under due care no uncertainty exists, but when active disintegration is going on fillings are far less successful as a rule, and more especially so in the immature mouth. The reason of this will be obvious. In the former case the charcoal is the only defect existing, and this, being removed and replaced by a non-porous substance, or one between which and the dentine no polar antagonism exists, is an effectual cure for the disease at the same time that it is a remedy for the defect. Not so, however, in the latter case ; the diseased or non-homogeneous portion of the tooth is less readily distinguished, and consequently is not so surely eradicated, and any portion being left soon tells its own tale by continuing the electrolytic action, and causing a recurrence of the decay. In all cases of this description, but more especially with the young and growing tooth, it is imperative, if success be hoped for, that this abnormal electric state be first counteracted by preparatory treatment previous to the introduction of a permanent filling. The electric condition of a body is only relative ; it may be positive to one substance, yet negative to another, and hence the abnormal negative part of the decaying tooth may, by induction, be readily restored to its normal condition, a course which has been pursued in our own practice with almost unvarying success for a long time past."—*British Journal of Dental Science.*

ARTIFICIAL EBONY.

"This substance is now being manufactured on a tolerably extensive scale. It is prepared, says a cotemporary, by taking sixty parts of sea-weed charcoal, obtained by treating the sea-weed for two hours in dilute sulphuric acid. Then drying and grinding it, and adding to it ten parts of liquid glue, five parts of gutta-percha, and two and a half parts of india-rubber, the last two dissolved in naphtha ; then adding ten parts of coal-tar, five parts of pulverized sulphur, two parts of pulverized alum, and five parts of powdered resin, and treating the mixture to about 300° F. We thus obtain, after the mass has become cold, a material which, in color, hardness and capability of taking a polish, is equal in every respect to ebony, and much cheaper."—*Popular Science Review.*

ODDS AND ENDS.

BY E. WILDMAN, M.D., D.D.S.

"IN the following medley, I propose, from time to time, to lay before our readers a series of formulæ and other matters that may be of practical use or of interest, as may occur to me or may be transcribed from my note-book, without much regard to systematic arrangement, trusting that, at least, some of the younger members of our profession will find something therein of value to them. In doing so, I shall give recipes that have been tested and found good, not offering any others unless especially noted, and those well authenticated.

"*Cements.*—Cements for retaining teeth to plate in fitting them down, or to try in the mouth before placing in the investment:

1. Gum mastic, 8 parts.
   Yellow wax, 4 "
   Color, q. s.
2. Gum damar, 7 parts.
   Yellow wax, 4 "
   Color, q. s.
3. Rosin, 2 parts.
   Wax, 1 part.

"Nos. 1 and 2 possess very similar properties, being sufficiently adhesive and strong to answer the desired end, and are preferable to No. 3, on account of being firmer and more readily cleaned off the work, prior to applying borax. Gum damar being so much less expensive than mastic, I use No. 2.

"To make these cements, place the vessel containing the wax and gum over a moderate heat, just sufficient to melt them, and stir until thoroughly incorporated; then add the color in quantity to produce the desired shade. Venetian red, drop lake or vermilion may be used. When all of the ingredients are well mixed, pour into a basin of cold water. To form into sticks, immerse the cake in water sufficiently warm to render it plastic. It is preferable to color it, as it renders it more sightly, and, also, we are better able to detect minute particles adhering to parts where solder is desired to flow and remove them. If desirable, it may be perfumed by adding an odoriferous oil just before pouring into cold water.

"The following makes an adhesive cement of a dark color, which may be made more agreeable to the eye by the addition of Venetian red or vermilion. It answers a good purpose to attach specimens to pedestals, etc.

4. Rosin, 4 parts.
   Gutta-percha, 1 part.

"First melt the rosin, then add the gutta-percha, cut into shreds, and stir until they are united.

"No. 5 is a good water-proof cement, but does not possess much strength; it will resist the action of water much better than shellac. An iron vessel coated with this composition will be protected from oxidization. In proof, I tested it on an iron frame aquarium which, after a constant exposure to water for four years, remained intact.

5. Pitch, 4 oz.
   White wax, $2\frac{1}{2}$ oz.
   Gutta-percha, $3\frac{1}{2}$ oz.

"First melt the pitch and wax together; then add the gutta-percha, cut into shreds, a little at a time, and stir until they are thoroughly incorporated.

"To make a cement for building up pebble work, etc. for an aquarium, add to the above, after the ingredients are united, white clay, perfectly dry and finely pulverized, in quantity about one-fourth the weight of the mass. In using the pebbles or articles to be joined, they should be warm, and the cement, in a fluid state, applied with a brush to the surfaces to be united.

"*Cap Cement* (6), so called by the late Professor Faraday. It makes a good strong cement to attach wood to glass. The parts to be united should be made quite hot, the cement applied in a fluid state, then firmly pressed together and retained until cool.

6. Rosin, 5 parts.
Yellow wax, 1 part.
Venetian red, 1 part.

"The Venetian red should be thoroughly dried and in a very fine powder, introduced a little at a time, and stirred into the melted mass.

"*Shellac Cement.*—Gum shellac makes an excellent strong cement for joining small surfaces of wood together, and in many cases is far more convenient than glue. The shellac should be flowed upon the surfaces to be joined, and then they should immediately be pressed firmly together while the shellac is in a fluid state; in a minute or two the pieces will be found firmly united.

"A convenient way of preparing gum shellac for laboratory use is to fuse the gum, as found in the shops, in a suitable vessel over a slow fire, being careful not to raise the heat higher than just sufficient to melt the gum, and, when fused, cast it in a mould; when cooled sufficiently to be plastic, but not adhesive, it may be worked into sticks. In manipulating this or No. 2, the hands should be kept moist with water.

"*Alum Cement.*—This is principally useful to the dentist in securing an instrument to a pearl handle; it is strong and durable, when not exposed to moisture, and at the same time colorless.

"Take the common alum crystals, place in a spoon over a quick fire; the alum melts in its water of crystallization so as to become perfectly fluid; while in this state, apply to the parts to be united and press together.

"To produce a good result, the whole operation must be performed expeditiously; care to be observed not to allow the water of crystallization to be driven off, or the fluid to cool before the parts are joined.

"*To Polish Ivory.*—Remove any scratches or file marks that may be present with finely pulverized pumice-stone moistened with water. Then wash the ivory and polish with prepared chalk, applied moist upon a piece of chamois leather, rubbing quickly.

"*To Polish Pearl.*—Take very finely pulverized rotten-stone and make into a thick paste by adding olive oil; then add sulphuric acid (oil of vitriol), a sufficient quantity to make into a thin paste.

"This is to be applied on a velvet cork; rub quickly, and as soon as the pearl takes the polish, wash it. This mixture, when properly applied, will give to pearl a brilliant polish."—*Dental Times.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEORGE J. ZIEGLER, M.D.

Starchy Food Unphysiological for Infants.—"At the meeting of the Obstetrical Society of London, July 7 (*Medical Times and Gazette*), a paper was read by Dr. Selby Norton on 'Teething.'

"In this paper the author advocated the opinion that the maladies usually attributed to teething are due to the wide-spread and unphysiological practice of feeding infants on starch foods. He showed that starch was non-digestible by the infant stomach, partly because no minute division of the starch granules could be effected in the infant's mouth, and partly because, from the mode of feeding, the greater part, at all events, of the starch is passed at once into the infant's stomach without being rendered soluble by the ptyalin of the saliva. The diseases usually ascribed to teething—diarrhœa, convulsions, and bronchitis—in the author's experience never occurred in a naturally fed child; and, on the other hand, they occurred sometimes in the first month, where the teeth obviously could exercise no baneful influence, and they occurred, too, when the gums were quite cool and natural. After considering these diseases at some length, and showing how often they could be directly traced to the irritation of bowel produced by starch food, he concluded by condemning altogether farinaceous food for infants, and advocating the sole use of cow's milk diluted with water.*

"Dr. T. Ballard said he was pleased to see some one come forward to support the 'heretical' doctrine that teething was not a cause of infants' disease—a doctrine he had advocated many years ago. While so far, however, agreeing with the author of the paper just read, he could not coincide in his view that starch was such a patent cause of disorder. He did not think starch, *per se*, was harmful, though, of course, it was not a substance on which an infant could be reared. With respect to the general subject of infant mortality, he thought that practical good would result from the inquiry, if the Society could agree upon some formula of dietary for general recommendation of a simple and intelligible character. He would also lay much stress not only upon the importance of sufficient food, but on the importance of not allowing the bowels to act more than twice in the twenty-four hours. This could be effected by attention to the mode of giving the food; by not allowing an infant to suck without obtaining the food it craves, or to suck too hard to obtain it. In either case the bowels became disturbed, and diarrhœa was the result. Should this occur while the child is at the breast, the too frequent motions indicate the necessity of some supplementary feeding; or, if the infant be fed entirely from the bottle, there is probably some defect in its construction or action. Where maternal milk, in sufficient quantity, could be obtained, of course

* Dr. Hiram Corson, of Montgomery county, Pa., has shown that the addition of water is also objectionable, as it floods the stomach, deprives the child of a large amount of nourishment, and causes partial starvation. The milk should be rich, undiluted, and given in sufficient quantities to satisfy the wants of the infant.—Z.

no other food was requisite. Next to this came the milk of some other animal, and, where circumstances required it, to this might be added some preparation of wheaten flour.

"Dr. Phillips considered it injudicious to give any farinaceous food to an infant under six months old. The practice was as physiologically incorrect as it was practically found to be hurtful. The paper read had not convinced him that no evils were ever caused by teething; but he quite believed that the evil effects ascribed to teething were often caused or increased by improper feeding. At the Children's Hospital, instructions 'How to bring up Babies,' had been distributed with the best effect.

"Dr. Brunton said that he also objected, *in toto*, to giving a child farinaceous food up to six or eight months. Up to that age, where sucking could not be carried out, he gave cow's milk and water, sweetened, increasing the proportion of milk as the child grew older.

"Dr. Routh said that on no point was there more evidence than against the use of starch for infants before they had teeth. For, 1, the assimilation of starch depended on its conversion into sugar by the saliva; but infants secreted no saliva for the first two or three months; 2, in infants dying after the use of starchy food, examination showed that it passed through the alimentary canal unchanged; 3, the alimentary canal of a baby was that of a carnivorous animal; 4, the food supplied to purely herbivorous animals recently born was animal. *Ergo*, starchy food should not be given to infants until, at all events, the appearance of teeth. He could not agree with the recommendation of cow's milk diluted with water, as a good food for infants. The milk, before it was purchased, was generally watered, deficient in cream, acid, and wanting in sugar of milk. If used at all, it must be mixed with lime-water, and sugar of milk added in the proportion of half to one ounce of lime-water, and a teaspoonful of sugar of milk to every half-pint of milk, with one-third water. It should be begun early, even from birth, in all cases where it was clear beforehand that the mother could not nurse long. The idea that it was wrong to mix two milks was fallacious, and his experience had proved to him that the earlier it was begun the more readily the child's stomach bore it, and in nine cases out of ten a child so prepared could be weaned readily and with safety. To one other point only would he refer—the congregation of infants in nurseries. This was a most dangerous practice. The atmosphere generated under these conditions was most baneful, probably from the quantity of ammonia generated from the urine, as well as sulphuretted hydrogen and other noxious gases from the stools. Children required air, and pure air especially. Their respiration was more rapid than adults. Such congregation of infants was always, therefore, a great cause of infant mortality. Malignant thrush, *muguet*, and contagious diseases spread like fire in such atmospheres."—(*Med. and Surg. Reporter.*)

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"*Blood-Corpuscles and their Physical Properties.*—We have often insisted upon the importance of education in the physical sciences as preliminary and fundamental to the study of physiology, pathology, and of medicine in general. Recently this doctrine was emphatically enunciated by the distinguished physicist, Robert Grove, in his address at St. Mary's Hospital; and, indeed, nothing can be more obvious than the

fact that, step by step, physicial science, in extending her boundaries, is encroaching continually upon the vague and hitherto incomprehensible realm of vitality, and giving us daily a firmer grasp and more perfect control over the phenomena of life, health, and disease. There are not wanting among us those who, supported by the history of the past, are sanguine enough to conceive that some day in the coming future the gradual progress of positive knowledge will enable us to compass and comprehend even the profounder mysteries of our common being. If such be in the nature of things possible, how much sooner might this coveted goal be reached by the systematic training of our body corporate in physical science and its methods of original investigation! Such reflections as these crossed our minds as we listened to a communication made to the Royal Society on May 27, 'On the Laws and Principles concerned in the Aggregation of the Blood-corpuscles, both within and without the Body,' by Professor Norris, of Birmingham, a paper largely illustrated by experiments of a novel and interesting character, and constituting an able exposition of the subject from a physical stand-point. Unfortunately, the limits of our space do not permit us to give more than a brief and incomplete sketch of these important researches, or even to refer to the numerous and beautiful experiments with which they were illustrated; and we must therefore content ourselves with referring those of our readers who may wish to see the steps by which the conclusions have been reached to the original communication in the Society's Proceedings or Transactions. Suffice it to say, that the whole of the phenomena of aggregation displayed by the blood-corpuscles, whether forming rouleaux or masses of adherent spheres, were accurately imitated by artificial bodies, disks, vesicles, liquid globules, etc., placed under conditions analogous to those of the blood-corpuscles. Further, the existence of an attractive influence in all such cases was satisfactorily demonstrated, and proved to depend upon what might be justly designated double cohesion—cohesion, in the first place, between the rigid body and the liquid, and in the second place between the particles of the liquid itself. That this attraction extended its influence to the blood-corpuscles and was the cause of their aggregation, the author held to be incontestably proved by the appearances observed in the spherical condition of the blood-corpuscles when in the act of grouping, the form of attraction here displayed being that exhibited by wetted films and plastic vesicles, and which, from its mode of operation, he termed progressive cohesive attraction. There were only two conceivable hypotheses by which this mode of union—the peculiarity of which is that in its action upon plastic bodies it converts curvilinear into plane surfaces—could be explained. The one was mutual attraction of the progressive order, *i.e.* an attraction which commences at the point of contact and gradually extends itself in all directions till its force is counterbalanced by the limits of the elasticity of the body; the other mutual compression. An examination of the photograph of blood-corpuscles which had undergone the spherical mode of aggregation showed that the hypothesis of compression was unequal to account for the manner of the grouping displayed by those corpuscles which were isolated from the general mass; besides, the conditions of mutual compression are altogether absent in bodies submerged in liquid and free to move, as in the case of the blood-corpuscles, because they are subjected to equal pressure on all sides. On the other

hand, the progressive form of attraction, above explained, covers all the phenomena, and allows them to be perfectly imitated. The general law of this attraction might be briefly stated as cohesion of like liquids submerged in unlike liquids or fluids, the rigid bodies or vesicles being simply localizers of one of the liquids. The intensity of the attraction was shown to be in the direct ratio of the cohesive dissimilarity or the neutrality of the liquids or fluids concerned. The application of this law to the blood-corpuscles involves the idea that the contents of the corpuscles and the liquor sanguinis have a cohesive dissimilarity, *i.e.* are not readily miscible with liquor sanguinis. This is, of course, self-evident if, according to some modern views, we regard the corpuscles as 'tiny lumps of a uniformly viscid matter,' inasmuch as such matter must be insoluble in and immiscible with the liquor sanguinis. The explanation is equally easy if we accept the old, and probably the true, view of the vesicular character of these bodies; we have only to assume that the envelope is so saturated with the corpuscular contents as practically to act as such contents would themselves act, *i.e.* to exhibit a greater cohesive attraction for their own particles than for those of the contiguous liquid.

"The cohesive power of the blood-corpuscles varies with varying conditions of the liquor sanguinis, and this is doubtless due to the law of osmosis, for we can readily imagine that when the exosmotic tendency is in excess the corpuscles will become more cohesive, and, on the contrary, when the endosmotic current prevails, less so. In any case, the increased cohesiveness will be due to increased extension upon the surface of the corpuscular contents.

"The author affirmed, in conclusion, that all that was required in the case of the blood-corpuscles, to bring them under the law he had educed, was a difference between their liquid contents and the plasma in which they are submerged, and that this difference was on all hands admitted. He did not contend that the difference was so great as between the liquids used in his experiments, but neither was the attraction so powerful. The power required to attach the corpuscles together was, on account of their exceeding minuteness, extremely small, as they were thus so much more removed from the influence of gravitation, and brought under that of molecular attraction."—(*Medical Times and Gazette.*)

Circulation of the Blood.—"Physiology, as a science, may be said to date from Harvey's great discovery of the circulation of the blood, rather more than two hundred years ago. Before that discovery a science of physiology was as impossible of attainment as a science of astronomy before the discoveries of Copernicus, of Galileo, and of Newton. During the present century physiology has made great progress, and within the last twenty-five years its rate of advance, owing to improved methods of research, has been more rapid than at any former period. It is not long since we have learned that Harvey's discovery, complete and accurate as it was, so far as it went, was yet not quite complete. For many years after the time of Harvey it was believed that the heart alone was concerned, not only in the propulsion of the blood through the arteries, but also in regulating the supply of blood to different parts of the body. Some time since the late Dr. Alison and others suggested that the irregular distribution of blood to various tissues and organs in

certain diseases is the result of an influence exerted by the small vessels upon the circulation. Then microscopic research discovered that the smallest arteries in all the tissues have muscular walls, with a contractile power which enables them to regulate the size of their canals, and thus to control the stream of blood. Lastly, Bernard and others demonstrated that the contraction of these arterial canals is under the influence of certain nerves called vaso-motor nerves. Paralysis of the vaso-motor nerves is followed by extreme dilatation of the minute arteries; on the contrary, stimulation of the nerves by galvanism excites contraction of these vessels to such a degree as for a time to close their canals. In this action of the minute arteries we find the explanation of the sudden changes in the color of the face which occur under the influence of mental emotion. The pallor of fear or anger, and the flush of shame, receive here their physiological explanation. Again, the discovery of this regulating influence of the minute arteries has led to the right interpretation of some pathological phenomena which had before been unexplained. It will suffice to mention three diseases upon which the recognition of this stop-cock action of the small arteries has helped to throw a new light. These are a fit of epilepsy, the collapse of cholera, and the hypertrophy of the heart which is usually associated with chronic Bright's disease of the kidney."—(Dr. George Johnson, *Lancet.*)

Plastic Surgery.—"Ever since the time of Tagliacotius, and more especially since John Hunter's immortal work on 'Inflammation' made surgeons understand the *rationale* of the union of parts newly brought together, plastic operations, as they are now commonly called, have been practiced more or less frequently, and with more or less success; but I doubt if even now their value and importance is sufficiently appreciated, or the enormous benefit which can be effected by them, when every other plan of treatment fails, in those dreadful contracted cicatrices which result from burns, is adequately recognized. Every surgeon must know of such cases. I have reason for believing that in the Leeds Infirmary such cases have been, and still are, more frequently and successfully treated by operation than they are in some places, and, perhaps, more commonly than some surgeons are aware of.

"In tabulating the records of operations done in the Leeds Infirmary during the past sixteen years, I find one hundred and seventy-two cases of plastic surgery entered. Of these, none were on the lower extremity; forty were on the upper, of which thirty-two were cured, six relieved, and two failed. These were all contractions of the axilla, whereby the arm was tied down to the side; of the bend of the elbow, the forearm being greatly contracted on the arm; or of the wrist, palm of the hand, or fingers. Many of the cases were extreme and complicated, more than one contraction existing. Fifty were of the neck and face, whereof forty-one are entered as cured, seven as relieved, one no better, and one as dead. Many of these, also, were extreme, requiring more than one operation. Several were operated upon by the late Mr. Teale, and supplied the data for his papers 'On Plastic Surgery.' Two cases were of the chest, both being relieved. Staphyloraphy was performed four times, two of the cases being cured, and two greatly improved. In one a rhinoplastic operation improved the nose. The remaining seventy-six cases were either of the cheeks, eyelids, or lips, the majority being single

or double harelip operations. It is, however, of cicatrices following deep burns that I wish more especially to speak, as I believe every other kind of operation than the transplanting of normal skin to be not unfrequently worse than useless. That occasionally some benefit may follow the stretching of the tender and inelastic new cutis, and the hard, rigid, fibrous bands under it; the dissecting the skin from the subjacent tissues, the simple division of it, the entire removal of it, and allowing the gap so caused to granulate and cicatrize afresh when on the stretch; or the attempt to form new cutaneous tissue by metallic setons, and various other contrivances, I am not prepared to deny, after what has been stated by surgeons to occur; but in my experience it has not been so, and I cannot but suspect that, if we had a fair account, after the lapse of two years, of most of those cases which at first appeared to have been benefited, we should find the condition of the parts very much less favorable than at first they promised to be; for almost invariably contraction in the new tissue gradually goes on until a hard, unyielding cicatrix is again formed, as bad as it ever was. John Hunter long ago wisely remarked that Nature was more chary of forming new skin, as though it were more difficult for her to do it, than almost any other tissue in the body. When she does form new skin, after the entire substance of the dermis and subcutaneous tissue has been destroyed, it is, as every surgeon knows, a very poor apology for the original structure. The only effectual method for obtaining a cure I believe to be the substitution of a portion of the neighboring sound skin for the cicatrix. That the attempt is not altogether free from risk is certain, for if the flap should slough, as it may do, the patient may be rendered worse than he was before. But in every operation there is some risk. The deformity to be remedied is often so distressing and serious, the cure in many cases is so complete, and the proportion of failures to cures is so small, that I am strongly impressed with the propriety of operating in every case where a satisfactory flap of sound skin can be obtained. The operation is so important, and frequently so tedious, that it is not to be undertaken without due consideration of all the proceedings to be adopted."—(THOMAS NUNNELEY, F.R.C.S., *Med. Times and Gaz.*)

"*Histological Alterations produced by Section of the Nerves—New Experiments.* By Prof. Paul Mantegazza.—Section of nerves gives rise to different morbific changes, such as:

"1. Congestion; 2. Paralysis; 3. Suppuration; 4. Muscular atrophy; 5. Profound alterations in the nutrition of bone (general atrophy, hypertrophy of the spongy substance, caries, osteophytes, etc.); 6. Hyperplasy of the connective tissue and of the periosteum; 7. Mortification of different tissues; 8. Hypertrophy of the lymphatic ganglia and alterations which are scrofulous in their character, anæmia, septicæmia, and other changes in the blood by the absorption of the products of putrefaction or of regressive metamorphosis." — (*Annales Médico-Psychologiques* and *Quart. Jour. Psychological Med.*)

Chloral.—Dr. B. W. Richardson made a report to the British Association for the Advancement of Science on this agent (*Lancet*), the "result of a series of experiments performed during the meeting by himself at the Exeter Hospital, assisted by Dr. Shapter, Dr. King, Mr. Ley, Mr. Wilson, Mr. Hawkins, and Mr. Drew. In pigeons he had found

chloral to produce sleep and insensibility, lasting from four to five hours, by the use of from one and a half to two grains of chloral, and that above that quantity it would kill. This had been applied both by injection and in the stomach. He found as the result of his experiments that perfect anæsthetic insensibility could not be produced unless the dose was increased to a dangerous extent. He gave detailed accounts of experiments with chloral upon pigeons, rabbits, and frogs, in twenty-three separate cases, and also carried on some with pigeons in the room of the meeting. He was not of opinion that chloral could be used instead of any of the present anæsthetic agents. It produced vomiting, and reduced the temperature of the body. It had some of the disadvantages of opium, and was no better in many other respects than that drug. Still, he thought they should be grateful to Liebig, who introduced it in 1832, as there might be considerable collateral benefit in suggesting a means for searching for advantages which might be obtained by the decomposition of medicines in the body."

"*Artificial Respiration.* B. W. Richardson, M D. (*Med. Times and Gaz.*)—Artificial respiration has not, as far as I am aware, been tried on the human subject after death by lightning-stroke. We have tried it here in several cases on animals which have been struck down by the discharge, and I have devised for these experiments a pair of pocket bellows, which leave nothing to be desired in respect to the production of a perfect and accurate imitation of natural respiration. The bellows are constructed really on the plan of the bellows invented originally by John Hunter, reinvented by M. Gorcy, of the Military Hospital of Neufbrisac, in 1790, under the name of the 'apodopnic' bellows, and again reinvented, about 1835, by Mr. Read, of Regent's Circus, Piccadilly. They are, as I have modified them, different from those which preceded, in being constructed of india-rubber, and in being exceedingly portable and manageable. By one grasp of the hand with these bellows we fill the lung of the animal, through one nostril, with fresh air, and by relaxation of the grasp we extract the impure air from the lungs—the bellows having two chambers, one for feeding the lung with pure air, the other for removing from the lung impure air.

"But despite all this care to make the process of artificial respiration practically perfect, we have found it by itself of no real efficacy in treating animals which have been struck by electrical discharge. I will make here an experiment in point. With one discharge from the Leyden battery we will strike down a large rabbit. I find the heart of the animal is still beating, and at once, by inserting the bellows-tube in the nostril and setting the bellows in gentle action, I induce artificial respiration. See, now, how accurate is the representation of the natural act of breathing; you might conceive that the animal was alive. But I keep this action up for any time without result; the nervous centres are under pressure, or are disorganized by separation of part, and the heart is under pressure which it will struggle to oppose in vain, until it becomes paralyzed by its own efforts to lift its column of blood. I do not therefore attach any importance to artificial respiration as a primary method of restoring animation after lightning-shock, but I think it would be an admirable adjunct to treatment by free venesection. Directly the heart were set at liberty from its bonds, the contraction of the right ventricle, effectively made, would send a wave of blood into the pul-

monary circuit; and if then that charge of blood should be allowed, by means of artificial respiration, to meet a charge of fresh air, the best results might naturally be anticipated. I would venture to lay down, as the second important rule in all cases of shock by lightning, that, so soon as a vein can be got to yield blood, the lungs should be gently and steadily charged and emptied of air by the action of a double-acting bellows, such as I have used to-day."*

"*Electricity for Lessening Pain in Extracting Teeth.*—Although dentists have long since discarded the use of electricity for lessening pain in extracting teeth, Dr. Pallas, of Bordeaux, has been attempting to bring it again into notice, believing that its failure has been caused by the irregular distribution of the electricity. He has invented an instrument which he considers will obviate this difficulty."—(*Medical Press and Circular.*)

Metallic Substances Amalgamated with Organic Bodies by Electricity.—Extract from "Lectures on Experimental and Practical Medicine. By Benjamin W. Richardson, M.D., F.R.S. (*Medical Times and Gazette.*) Research with the large induction coil of the Royal Polytechnic Institution.

"*Gentlemen,*—Since we last met there have been several recorded cases of death by lightning which, in a striking manner, illustrate some of the facts that have passed before us here in our experimental essays. Among other cases, I notice one which has recently occurred in Belgium. A monk, engaged with his brethren in the fields carrying hay, was leading the horses drawing one of the loads, when, an hour of prayer having come, he kneeled by or near to an iron fence. While in this position he was struck by lightning, and was killed instantly. On his body were found several of the characteristic marks of an electrical stroke, such as we have seen to follow upon the discharge from the Leyden battery. But the mark which caused the greatest wonder was an arborescent mark. The exact figure of a tree, says the narrative, was left on the body, the branches being defined in the most perfect manner, to the minutest ramifications.

"We know now what the meaning of this appearance is: that it is the definition of venous trunks, as Beccaria first and correctly taught.

"The mention of these marks on the body leads me to make one other preliminary observation respecting the metallic stains or markings which it is said have been seen on the body after lightning stroke. I maintained in a previous lecture that these markings are ecchymoses, and this is often true; but I should like to supplement that observation by repeating the further observation that they may be true metallic lines, when the metal on the body which has been struck is sufficiently thin to be fused by the current of force which vibrates through it.

"We will prove this proposition by experiment. We will take a foot which has been removed from a young pig immediately after the animal was killed and dressed. The skin is beautifully white and delicate. Around the foot we will lay a thin gold wire or chain, and then dis-

* In cases of suspended animation, when atmospheric air at ordinary temperatures is insufficient to produce arterialization, resort should be had to *heated* air, oxygen, or nitrous oxide, as heat exerts a potent influence in increasing chemical affinity and life action.—Z.

charge from the large Leyden battery through the wire. This done, I pass you round the foot, and you will see distinctly, not only a line marking what was the position of the wire, but the metallic gold, inlaid as it were in the skin. We may accept, therefore, that the vulgar statements of the finding of metallic lines on the bodies of persons struck by lightning are sometimes true. I failed before to illustrate this fact because the wire was too thick, and conveyed the discharge without being fused. And here there is suggested to us a very important piece of knowledge bearing on medico-legal investigations. Persons are sometimes found dead after lightning storms, and, it may be, a doubt arises respecting the cause of death, or, if the cause be clear, as from lightning-stroke, respecting identity of person. In such a case the detection of a metallic mark on the body would be of the greatest moment. The portion of skin containing the mark may be carefully dissected out, and from the color of the stain an idea may be obtained as to the metal that has left the stain. Moreover, by subjecting the part to chemical analysis, the precise metal may be determined. Armed with these two facts, the medical witness could not only say that the mark he found on the body was a true metallic mark, which nothing except electric discharge could strike on the body, but he could further say that the deceased, at the time of being struck, wore or carried a certain metallic substance, of gold, silver, copper, or other metal. In some measure, too, the character of the stain would determine the intensity of the discharge which produced it, and the thickness and substance of the metal which had been fused. A discharge of low intensity might produce heat of the metal and a burn, but it would not fuse even a very thin metal in such a manner as to leave a true metallic stain. A discharge of great intensity, such as we produce with the cascade battery, would produce no stain and probably no mark at all; in other words, it would not be diverted from its course, but would penetrate directly through the organism. The discharge which effectually produces the stain is that which we obtain from the common Leyden battery.

"When gold or other metallic substance is fused by the discharge in contact with the natural coverings of animals, such as fur, hair, or feathers, the metal seems to combine with the parts so intimately as to form a part of the structure. In the fur of the rabbit we saw, at the last lecture, the gold producing a kind of natural pigment, so that one might say, looking at the animal which was originally white, that it was now gray and white: the color lasts, too, until by new growth the fur is replaced. If, therefore, we cannot turn a black white, a process which may not in time be so difficult a task after all, we can turn a white to grayish-black with perfect readiness.

"An exceedingly pretty experiment in this same direction may be made with the feathers of birds. Here is a feather of exquisite whiteness; I have woven through it some thread of gold; here is another similar feather through which I have woven thread of silver. I will ask our friend, Mr. Pepper, to pass the Leyden discharge through these metals interwoven with the plumage. He does so, and now you see the feathers are entirely changed in color, variegated in wavy lines. The feather interwoven with gold is of purple tint in the colored parts; the feather interwoven with silver is of silver-gray, like the feather of a gray parrot, and so firmly is the metal implanted that it could not readily be removed except by chemical action, which would break up the

structure. Vitruvius, telling of the interweaving of gold in the tissues used for dresses by the rich dames of antiquity, informs us that, in order to preserve the gold, the dress, when it was no longer wearable —when it was tattered, we may presume, or out of fashion—was put in an earthen vessel and burnt over a fire. Then the ashes containing the precious metel were carefully gathered together and put into water, where they were treated with quicksilver, which picked up the gold, and converted it into a mass which in these days we call an amalgam, which amalgam, he says, was afterward made to yield back the gold by compression through a piece of cloth. By our modern science we could even be more economical than the artisans of the time of Vitruvius, for we could mark cloth with gold, using grains where they used ounces, and still retaining the power to get our gold back again when we desired. The amalgamation of metallic substances with organic bodies by electrical discharge, such as we see in the feathers before us, opens up a curious physiological question, viz., the part which metals, in a state of very fine subdivision, play in effecting the coloring of many structures of living animals. Here is a red feather plucked from one of the birds called the Turaco. The researches of Mr. Church have proved that this feather contains the metallic element copper, and he has produced for us from it a red coloring matter, which he has named Turacine, and which contains nearly six per cent. of copper. In Turacine the metal copper is a true chemical combining element—as perfect a combining element as sulphur and carbon in albumen."

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"*Reproduction of Bone by the Marrow of Bones.*—M. Gonjon has won the prize of 500 francs, granted by the French Academy of Sciences, for demonstrating that the marrow of bones has the same power of reproducing bony substance as the periosteum; that engrafted elsewhere in the body it possesses the extraordinary quality of reproducing bone, as the author showed in a rabbit in which bone had been made to grow under the skin by the transplantation of some of the animal's marrow!" —(*Medical Record.*)

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"*Morbid Elongation of Bones.*—Professor Langenbeck has recently read a paper before the Berlin Medical Society on the subject of 'Morbid Increase of the Length of the Long Bones.' In this paper he has called attention to the fact that the long bones, when subject to irritation during the growing period of life, are apt to increase in length and thickness. * * * * * * *

"From his observations he draws three conclusions, viz.:

"1. Morbid causes which produce irritation, and hyperæmia of the bony tissue, have as a result, as long as the bone-growing period lasts, an increase in length, as well as in thickness of the bone.

"2. The increase of length concerns principally the diseased bone, but it can also be observed in a healthy bone of the same extremity.

"3. The bone lengthened through the increase of growth, retains its dimensions through life. An after shortening through resorption does not take place, even although the original cause—viz., the bone disease —should long since have ceased to exist.

"He then makes the proposition,—if it be not possible to artificially regulate the growth of bone, and through that to hinder or accelerate it. With this view he made an experiment on a dog about eight weeks old,

by inserting ivory pegs into the femur and tibia of the left side. About four months later, the dog was killed, and on comparing the experimented bones with those on the opposite side, he found that, 'the femur showed no alteration in shape, but the joint surfaces of both hip and knee joints were slightly smaller, the diaphysis slightly thickened and uneven. . . . The tibia, in the diaphysis of which two ivory pegs had been inserted, showed these changes somewhat more marked. . . . On measurement, the femur and tibia both showed an increase of five millimetres in length, making in the whole limb an increase of ten millimetres.' It appears from this that both bones presented elongation and thickening of the diaphysis; but the epiphysis had become somewhat smaller. Here, also, the fibula was lengthened to a corresponding extent as the tibia, though that could only have been caused by the extension exerted on it by the growing tibia; and, what is more remarkable, it had obtained this without losing its connection with the tibia, as took place in a case described by Parise."—(*Berlin Correspondence of Lancet* and *Medical Gazette.*)

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"*Cleft Palate.*—In the *London Hospital Lectures and Reports*, Mr. J. W. Little records two cases in which an operation was performed for this deformity, and in each a fissure involving part of the hard and the entire soft palate was closed by one operation. This proceeding has been recommended by Langenbeck and Esmarch, and is now generally adopted in consequence of its success in the hands of those surgeons." —(*British and For. Med.-Chir. Rev.*)

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Interdental Splint for Treating Fractures of the Inferior Maxilla. By E. A. Clark, M.D.—"Two dental splints are made of vulcanized gutta-percha, so as to conform accurately to the shape of the teeth in both jaws, or where there are no teeth, or some of them are wanting, to the alveoli, in such a manner as to prevent the possibility of any lateral displacement in the fragments. Where the teeth are perfect, the plates need only fit upon the crowns and side of the teeth without coming in contact with the gums at all. The splints that I have used were manufactured for me by Dr. Homer Judd, a most excellent practical dentist, of St. Louis, by the same process that an impression of the jaw is taken in plaster of Paris, for plates intended for artificial teeth. In taking the impression for the lower jaw, the plate filled with plaster being placed in position upon the teeth, both hands of the operator placed beneath the jaw, forces the fragments into position, where they are held until the plaster becomes sufficiently firm to preserve the cast. From these casts the gutta-percha splints are moulded, and subsequently vulcanized. The gutta-percha thus prepared has such a degree of firmness that the plates can be made very light and delicate, allowing a part of the teeth to project through the surface of the plates, thus fixing the splints more firmly. Previous to vulcanizing the plates, four small pivots are inserted into them, two on either side, opposite the last bicuspid teeth. To these pivots the ends of the triangular spiral springs are hooked so as to admit of motion upon the pivots. These triangular springs are made of brass wire one-sixteenth of an inch in thickness, the spiral portion being formed of two turns of the wire at the anterior, angular or central portion, while the ends project backward to the extent of an inch, to be attached to the pivots on the outer sides of the splints, so that when the plates or splints are in position, as shown in the dia-

gram, these springs (the spiral portion of which projects slightly in front of the angles of the mouth) force the inferior maxilla downward, with a force proportionate to the strength of the springs.

"In order to adjust the splints properly, the springs should be compressed by grasping the plates between the thumbs and fingers, so as to insert them between the jaws, and place them in proper position upon the crowns of the teeth; then force the fragments into their proper position, when the inferior plate will be found to fit the jaw accurately, which it will not do until the bone is properly adjusted. After the plates and fracture are once in position, the mouth will be forced wide open by the action of the interdental springs. This is counteracted by a sling bandage passing beneath the jaw and over the top of the head, forcing the jaws in such proximity as to leave a sufficient space between them in front so as to enable the patient to take food and drink, and at the same time allow him to talk so as to be understood distinctly, while he is also enabled to expectorate without difficulty. The amount of space that will exist between the plates in front will depend upon the amount of force necessary to be used by the sling bandage, and which should be just sufficient to place the fragments in their proper axis. If the force required for this purpose should be greater than the resistance of the springs in any given case, and force the plates in contact with each other, the springs should be removed and replaced by stronger ones. Another difficulty existing in the apparatus of Gibson and Barton is obviated in this appliance, *i.e.* instead of drawing the anterior fragment backward, in which direction it is already displaced to some extent in fractures of the body of the bone, the interdental springs, when compressed by the sling bandage, have a tendency to push the anterior arch forward. While, by keeping the inferior maxilla depressed by the force of the springs, the submental muscles are in a measure relaxed, and the tendency to displacement downward and backward of the anterior fragment is diminished. Indeed, the principle involved in the apparatus is to substitute these two plates for the jaws, the former of which is entirely under our control, by means of the interdental springs, so that just as we control the splints so do we control the jaw, while, at the same time, the force exerted is operating upon the entire surface of both maxillæ, thus adapting the apparatus to fractures occurring at any point of the jaw that can be reached by the material necessary to secure a cast of the fragments, regardless of the absence or irregularities of the teeth or the character of displacement of the fracture."—(*Medical Archives.*)

Splint for Treatment of Fracture of Lower Jaw.—Prof. Wm. G. Bullock gives, in the *Amer. Journ. Med. Sciences*, the following description of an improved apparatus contrived by himself and Mr. A. Wilcox, dentist: "This instrument consists, like that of Lonsdale's, of a grooved plate or dental splint made of ivory, metal, or vulcanized india-rubber, accurately adjusted to the teeth or alveolæ (by first taking an impression of the jaw, as is done by dentists, in wax, gutta-percha, plaster of Paris, or some pliable substance), to which grooved plate are welded projecting arms of stout iron wire, about opposite the bicuspid teeth, or a point corresponding to the corners of the mouth, arched so as comfortably to project out of the mouth without interfering with the lips. Herein the instrument differs from that of Lonsdale's, whose grooved plate is attached to a vertical bar passing over the cen-

tre of the lip, and is consequently more inconvenient to the patient than the former, the arms of which emerge *at the corners of the mouth.* The ends of the projecting arms are bent to form holes, through which pieces of cord, thread, or wire are passed to attach the dental splint to a piece of wood, say a portion of a cigar-box cover, for a chin piece, placed under the jaw, serving the purpose of a submaxillary splint. This latter should have four holes in it, two on either side, to make it more secure.

"This comprises the entire apparatus, and is applied to a fracture of the lower jaw, whenever the fracture is in the body of the bone, by fitting the dental splint to the teeth, placing a compress of patent lint or some soft material between the under surface of the chin and the submental splint, then tying the tails of the thread, or twisting the wire previously passed through the holes in the latter splint, as seen in the wood-cut, to the projecting arms of the former, thus doing away with the necessity of *bandages over the head altogether.*

"After trying the usual methods by bandaging unsuccessfully, as well as the instrument of Mr. Lonsdale, this apparatus was applied with the most *satisfactory and agreeable results.*

"The dental splint is represented as being fenestrated ; the object of this is to allow the teeth of the upper and lower jaw to dovetail, or articulate with each other, as the dentists say, in cases when there is an inequality in the size of the teeth, or irregularity in their position, so as to bring the fractured ends of the bone into perfect coaptation, without one or two projecting teeth interfering with an accurate adjustment of the fracture. If this apparatus is properly understood and applied to the fractured jaw, the patient can go about his usual avocations, *take his food, and talk without fear of displacing the fragments of the broken bone,* and without the necessity of wearing a bandage or handkerchief tied over the head.

"The objects had in view are precisely those laid down by Lonsdale,—'To fix the two portions of bone between two parallel forces by applying one on the teeth and the other under the base of the jaw ; lastly, to keep the two portions of bone on the same vertical plane, by fixing them in a grooved plate, placed along the teeth.' The advantages, such as lightness, adaptability, simplicity, and convenience, gained by this instrument over that of Lonsdale's, or any of those figured in *Hamilton on Fractures,* or in Wales' *Mechanical Therapeutics,* cannot, it appears to me, be disputed."

Carbolic Acid in Dissecting Wounds and Pustules.—Dr. C. F. J. Lehlbach says—Transactions of the Med. Soc. of New Jersey (*Med. and Surg. Reporter*)—"I had the misfortune of unconsciously scratching different parts of my hands during a post-mortem examination. In two days not less than seven dissecting pustules appeared on both hands. After having used nitrate of silver, ammonia, etc. without benefit, until the glands in the axilla became painful and swollen, I resorted to carbolic acid. The pustules ceased to spread, dried up, the inflammatory areola disappeared,—that was the end. Two weeks ago the same thing occurred again. The pustules of two days' growth were touched with carbolic acid once,—that was the last of them."

"*Dental Appliances.*—Mr. James Wallace, of Glasgow, has patented the use of aluminium as a substitute for other metals when used for

dental purposes. His method consists essentially in joining the plates and other parts, to which artificial teeth are connected, of aluminium, the different pieces of which are fastened together by vulcanite or other metallic material. Another part of the invention consists in engraving a design on the part of the plates next the flesh of the mouth, and by which they are more securely held in place than when formed plain or smooth."—(*Student and Intellectual Observer.*)

"*Tooth-Brushes.*—There has lately been introduced into the market a porous form of vulcanized india-rubber, called india-rubber sponge. It is proposed to substitute this material for bristles in the manufacture of tooth-brushes. To effect this, Messrs. P. B. Cow and John Hill, of Cheapside, fix a piece of india-rubber sponge to a handle of bone or ivory, and they form ridges on the surface of the spongy material. Other brushes are made in a similar manner by fixing spongy-vulcanized india-rubber to a rigid back or handle; or, in some cases, as for horse-brushes, a rigid back only is required. In some cases, the spongy india-rubber is checkered or cross-grooved. This material is found to answer well for the purposes to which brushes are generally applied."—(*Ibid*)

"*Salivary Glands under Emotion.*—In an interesting article on the mode of conducting criminal trials in France, M. Maxime Ducamp, speaking of the introduction of the prisoner into court, observes—'It is rare that the accused, who has had long days of solitude and reflection to prepare himself for this terrible ordeal, does not put on a good countenance. But a physical phenomenon which is invariably produced indicates to the experienced eye the strength of the sensations which he is endeavoring to master. All depressing emotion acts directly on the salivary glands, diminishing a portion of their secretion. Hence it induces a constantly repeated motion of deglutition which may be followed on the neck of the accused by the perpetual to-and-fro movement of the *pomum Adami.* This bone, incessantly descending and reascending, seeming as if making an effort to arrest the passage of the words, is sometimes so violently agitated that it might be regarded as seized with convulsions.'"—(*Revue des Deux Mondes* and *Medical Times and Gazette.*)

Gases of the Saliva.—"The animals employed in Pflüger's experiments were dogs. In the first animal, which had probably been fed on vegetable diet, 100 cc. of saliva contained—

Oxygen	0·4	per cent.
Uncombined carbonic acid	19·3	"
Carbonic acid eliminated after addition of PO_5	29·9	"
Total carbonic acid	49·2	"
Nitrogen	0·7	"

"The saliva of a second animal, to which animal diet had been freely given, yielded—

Oxygen	0·6	per cent.
Uncombined carbonic acid	22·5	"
CO_2 eliminated after addition of phosphoric acid	42·2	"
Total carbonic acid	64·7	"
Nitrogen	0·8	"

"The large proportion of carbonic acid in the saliva, exceeding that of any other animal fluid, is very remarkable."—(*Archiv. f. d. Gesammte Physiologie* and *British and For. Med.-Chir. Rev.*)

"*Extractum Gallæ Compositum* (for toothache).—

"℞.—Gallæ pulv., No. 40, four troyounces.
Pyrethri rad. pulv., No. 40, three troyounces.
Opii pulveris, half a troyounce.
Glycerinæ, a troyounce.
Alcoholis diluti, a sufficient quantity.

"Mix the powders, moisten the mixture with three fluidounces of the diluted alcohol mixed with the glycerin, and pack in a conical percolator. Then pour on diluted alcohol until a pint of tincture has passed. Evaporate on a water-bath to a soft extract and preserve it for use.

"This extract has been used for thirty years as an application to painful decaying teeth where the nerve pulp is sufficiently accessible to bring the extract into contact with it. The glycerin has been added more recently to prevent the extract from becoming friable. A solution in which these quantities are present in a pint, odorized with oil of gaultheria, makes a good liquid preparation applied on cotton. The soft extract is applied by inserting a pellet in the cavity, and then a wad of cotton, advising the patient to reject the saliva which freely flows from the action of the pyrethrum on the salivary glands."—(*Amer. Jour. of Pharmacy.*)

Astringent Mixture for Odontalgia.—"Nitric ether and sulphate of alumina are mixed so as to form a paste, which is applied to the cavity. It never occasions any inconvenience, the most violent toothache is promptly relieved, and, after several applications, the affected tooth becomes insensible."—(*Jour. de Chim. Méd.* and *Ibid.*)

"*To Remove Acid Stains and Restore Color.*—When color on a fabric has been accidentally or otherwise destroyed by acid, ammonia is applied to neutralize the same, after which an application of chloroform will in almost all cases restore the original color. The application of ammonia is common, but that of chloroform is but little known. Chloroform will also remove paint from a garment or elsewhere, when benzole or bisulphide of carbon fails."—(*Journal of Applied Chemistry.*)

Decimal System of Weights and Measures.—"As we have, unhappily, not yet adopted the decimal system of weights and measures in England, it may be convenient to some of our readers if we append a brief memorandum of the relations which the French gramme and mètre bear to our standards, avoiding as much as possible nice fractions:

A gramme is about $15\frac{1}{2}$ grains troy.
A mètre " $3\frac{1}{3}$ feet.

"Multiples of these bases are expressed by Greek, fractions or divisions of them by Latin prefixes—thus:

A decagramme = 10 grammes.
A hectogramme = 100 grammes.
A decigramme = $\frac{1}{10}$ gramme.
A centigramme = $\frac{1}{100}$ gramme.
A milligramme = $\frac{1}{1000}$ gramme.
A décamètre = 10 mètres.
A décimètre = $\frac{1}{10}$ mètre = nearly 4 inches.
A centimètre = $\frac{1}{100}$ mètre = nearly $\frac{4}{10}$ inch.
A millimètre = $\frac{1}{1000}$ mètre = nearly $\frac{4}{100}$ inch."—(*Lancet.*)

"*Pyrometer.*—Everybody knows the difficulties which stand in the way of exactly estimating high temperatures. The best pyrometers we have had hitherto can only be supposed to give approximate results, and some of them may be very wide of the truth. We notice, then, with pleasure one devised by Mr. Lamy, which shows within two or three degrees Centigrade the temperature of a furnace gradually heated up to redness, and gives its indication at a distance from the furnace, so that at a porcelain factory, for example, a manager can sit in his office and see the temperature of all the furnaces in his establishment. The instrument is as simple as it seems to be efficient. It is merely an iron retort containing marble, the neck of which communicates by means of a narrow tube with a needle moving over a dial-plate. As the heat rises, the marble is decomposed, and carbonic acid is set at liberty. A special contrivance measures the tension the gas arrives at, and as this has a direct relation to the temperature, the measure of one is made the measure of the other. Up to a certain point, we have little doubt this instrument may be relied upon."—(*Mechanics' Magazine. Amer. Artisan.*)

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"*Leveling Oil-stones.*—The writer has always experienced difficulty in attempting to shape an oil-stone, or slip for sharpening gouges. The ordinary way is to grind off the highest parts and then rub it on a gritty floor, or if near a foundry to get some parting sand and sprinkle on the floor or board on which you are rubbing; better still, if you can find the true surface of a casting before it is cleaned—this will cut it away quite fast. But recently, while trying to shape a small slip, it occurred to me to try some glass paper, and to my surprise I found that it cut away very fast. For trueing an ordinary oil-stone for sharpening planes, take a sheet of glass paper No. 2, and lay it on the bench and rub your stone on it; in this way you can true the stone in one-quarter the time it would take in the ordinary way; and carpenters have always such means at hand. Five or ten minutes' rubbing will be found sufficient. Your glass paper will not be spoiled by the operation."—(*Oneida Circular* and *American Artisan.*)

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"*Why do we Oil our Whetstones?*—We oil our whetstones for several reasons. The first is that almost all stones, unless oiled, become glazed or burnished on the surface, so that they no longer abrade the metal. The second reason is that most stones, after being oiled, give a finer edge, than they do in a dry or merely wet state. The pores of the stone become in a measure filled up, and, while the action is rendered continuous, its character is altered. A dry stone is very apt to give a wire-edge to a tool, and although this sometimes happens when oil is used, yet it does not occur nearly so often. Some stones work better with water than oil. It has been said that a little carbolic acid dissolved in the water which is used to moisten a whetstone or a grindstone will greatly increase the friction, and thus promote the action of the stone upon the steel instrument. If this be true, and there be no unforeseen drawback, carbolic acid will prove invaluable to all who have to sharpen tools or grind metallic surfaces."—(*Mining and Scientific Press. American Artisan.*)

THE

DENTAL COSMOS.

NEW SERIES.

VOL. XI. PHILADELPHIA, DECEMBER, 1869. No. 12.

ORIGINAL COMMUNICATIONS.

SENSITIVE DENTINE.

BY J. BROCKWAY, ALBANY, NEW YORK.

DENTINE, a term of recent adoption, supplies a want, and I shall use it to designate that portion of a tooth formerly, though not pertinently, called bone or ivory.

The old physiologists divide a tooth into three parts: the crown, the neck, the root. I shall devote this article to the crown, and for my present purpose will divide that into five parts: enamel, membrane, dentine, pulp, nerves; or, in other words, the vitreous, membranous, osseous, pulpous, and nervous, disregarding the venous.

Both enamel and dentine—like bone, ivory, horn, shell, hair, and the epidermis of the skin—have much the same analysis, being substantially lime-salts, phosphate, and carbonate. Yet as they materially differ from each other, they more widely differ from their kindred bone, horn, etc. They differ from bone and horn alike, in that neither enamel nor dentine are capable of growth or extension, after their form is once complete. Nor do they differ less in their formation, habits, and diseases,—but I shall devote this article chiefly to that difference in their organism which renders the one sensitive and the other not. Enamel is generally regarded as an unorganized vitreous deposit, and in that respect like shell; but dentine in its normal state is supplied with a delicate and highly sensitive organism. And yet the dentine or osseous matter of the tooth is no more sensitive than hair, horn, or nails; although in speaking of *sensitive* dentine we include the organs of sensation, the nerves and the membrane, whose entire web, warp, and woof is nearer fibrils. But my reasons for speaking of them as distinct and separate parts will be obvious as I proceed. I will then first state what I wish very briefly to demonstrate.

First, enamel is a vitreous, insensitive deposit; second, the membrane which lines and unites the enamel to the dentine is but a web woven of

the attenuated nerve fibrils ; third, that nerves ramifying or traversing the dentine are lateral branches, which put off from the main nerve that passes in at the point of the root, running through the pulp and dentine, the whole length of the tooth ; fourth, that dentine, when those nerves are incised, is insensitive ; and fifth, that the cutting off of the principal nerve destroys the sensibility of all the dentine below it. The main nerve has some likeness to the top root of certain vegetables, with their lateral branches and attenuated fibres.

It is questioned whether ultimate fibrils have ever been seen. Probably *not*, singly ; but the membrane covering dentine, as does the membrane the white of an egg, was, thirty years ago, dissected and made visible to the naked eye by Dr. Hayden, of Baltimore ; and this, as I suppose, is nothing else than the most attenuated ultimate nerve fibrils. This membrane too is often denuded in the living tooth, but is better discerned by the touch than by the eye. The dead tooth is the better subject for dissection. This, sometimes, needs but to be thoroughly dried, or at most slightly heated, to scale the enamel from the membrane and the membrane from the dentine. But as the main branches of the great central nerve are scarcely visible under the microscope, we are obliged to feel after their more minute fibrils.

That the entire surface of denuded dentine is covered with the most delicate and sensitive nerves is but too palpable to the dental operator and his patient ; no part of such surface can be touched with the sharpest point without finding evidence of the presence of a living, active nerve, capable of communicating with the brain with electric speed ; and, no doubt, the interruption is attested by a whole company of these dental guards, ever ready to raise the war-cry against violence from acids or instruments.

That the dentine itself is not alike sensitive at every point is equally assured by the testimony of the senses. When by any means the enamel is abrased, the denuded membrane will be sensitive at *every point ;* but we have only to circumcise or cauterize the denuded spot, and the dentine may be touched or excavated without pain. Here, then, we have demonstration that the lateral nerves, passing from the main central nerve, are few and far between, compared with the multitude of fibres that enter and compose the membrane.

But still another evidence : in case of decomposition of dentine, or incipient or deep and extensive decay, it will be found that, unless the pulp is exposed, the walls of the cavity may be explored and thoroughly excavated with little or no pain, except as the instrument comes in contact with the membrane and under surface of the enamel ; or, as is often the case, there will be one or more points in the cavity less decayed than the surrounding parts. These are always the most vital points—vitality resists chemical action and decomposition of dentine. These sensitive

spots, then, are made up, to a greater extent than the surrounding substance, of dentinal fibre, or it is at these points that the main branch nerve enters. These spots need only to be incised near the enamel to destroy sensation.

In support of the theory that the central nerve throws off branches laterally terminating with innumerable fibrils in the membrane, I mention one other fact which seems conclusive: cut off the longitudinal nerve, and all below is insensible. Cut or fracture this at the point of the root, and the whole tooth is insensitive; divide or cut it off at the neck of the tooth, and every nerve fibril in the crown is paralyzed; perforate the centre of an incisor tooth, and just so far as the drill is carried is the dentine rendered insensible. Ordinarily, an incisor tooth, in a person of forty, may be drilled from the cutting point nearly an eighth of an inch without reaching the pulp,—then, just so far the crown may be *filed* without feeling. And in the case of dwarf teeth, which are usually without any pulp or visible blood-vessels, the centre being perforated, the entire dentine is insensible to the file. And here, let me observe, nerves are not always accompanied with blood-vessels.

There are four classes of teeth where nerves are found, but no blood-vessels or capillaries.

The first class consists of nearly all dwarf teeth and supernumeraries (generally dwarfed); these, very soon after development, will be found without pulp or blood-vessels.

Although not entirely nerveless, the dens sapientiæ are often of this class, as well as malformed and dwarfed lateral incisors.

To the second class belong the teeth of old persons when the pulp, always pregnant with dentine, has perfected deliverance, exhausted itself and is no more.

Of the third class are the teeth whose crowns are worn up, and having excited both the exhaustive energies and the cuperative action of the pulp, have filled the natural pulp-canal with dentine, leaving only a still sensitive nerve.

The fourth, but less common class, comprises the teeth where tartar has insinuated itself quite to the point of the root, exciting the capillaries to hasten their work and retire.

So far as my observation, in a practice of fifty years, has gone, these are the only cases that furnish grounds for the remarks of Professor McQuillen on "Calcification of Dental Pulp," in the October number (1868) of the Dental Cosmos. That nature intends the ultimate entire conversion of pulp to dentine is attested, not only by the four classes of cases alluded to, but by her invariable habit of yielding the substance of the pulp to the supply of dentine in our cattle and sheep as they fill up the allotted term of life.

And for the evidence of nature's handiwork in this line, one needs

but to examine the teeth of cows past the age of twelve years; what remains of the pulp canal not worn up, will be found filled with dentine. It is not singular that in the work of converting its own substance into dentine, the energies of the pulp should be sometimes overtaxed, and its action become spasmodic, resulting in the formation of incoherent nodules, and in protracted pain, culminating in inflammation and ulceration at the point of the tooth, already destitute of any vitalizing organism. The prognosis of this disease is not often difficult; the treatment, either longitudinal or alveolar drilling.

But as I must close this paper, suffice it to say, sensitive dentine depends upon a principal longitudinal nerve, extending near to the biting surface, and either putting off through its entire length lateral branches, or near its terminus dividing itself and spreading into the web which constitutes the investing membrane; and hence, the most sensitive portion of dentine is in the crown of the main and central nerve, or in the membrane which is the terminus and general depot of these telegraphic fibrils.

And now for the practical lesson: cutting off the principal or the lateral nerves destroys sensibility in the dentine, but does not necessarily prevent toothache, as this is often a consequence of inflamed periosteum. But this article is intended chiefly to show the mode of treatment of sensitive cavities. This theory seems to account for the points which, though occult, are obvious to the experienced operator, that cavities in teeth are usually most sensitive and supplied with nerves at the union of the dentine with the enamel, and hence the best obtunder of pain is a well-tempered, sharp incising instrument; the patient being advised that the cause of sensation is the existence of inconceivably minute nerves, that need only to be cut to be cured. But in many cases the sensibility centres in one or more nodules, which being incised unnerves the entire surface. Still it is advisable, ordinarily, with a properly-guarded and firm hand, not only to incise the sensitive nodule, but, as nearly as possible, at one stroke to circumcise the entire cavity.

That this is the safest and best way of disposing of the sensitive portions of superficial caries, without the use of chemical or acrid agents, has the testimony of fifty years' experience.

DUCT COMPRESSORS.

BY THOMAS C. STELLWAGEN, M.D., D.D.S.,

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The necessity for keeping the cavities dry during the performance of the operation of filling teeth, especially when adhesive gold is used, has of late years attracted so much attention that many means for accomplishing this purpose have been devised. It is not surprising that this is the case in a profession the practice of which requires ingenuity in surmounting obstacles by novel expedients.

Among the numerous apparatus, there must be some that are of doubtful utility, or at least, in the hands of the careless or uninformed, liable to become dangerous as sources of injury to other portions of the organism, perchance of equal importance with those in whose treatment they are designed to assist.

Is it not possible that the prevention of the flow of saliva from the glands by compression upon the ducts may in some instances be of questionable propriety; and, although serious consequences have not been reported, does there not seem to be an undue interference with the physiological condition of these very important glands, that might result in painful and perhaps permanent derangement of their conditions and functions? It is always a matter for consideration, whether extreme measures are justified by the premises, particularly where, as here, so many simpler contrivances for keeping out the saliva are at hand, and where, when properly applied, it is the exception that they fail. The avoidance of some kinds of food, particularly liquids, and use of others, as salt meats and salines generally, a few hours before operating, might assist in keeping down the flow.

Undue irritation of the tissues of the ducts, glands and their surroundings, by the direct pressure of the instruments, or the distention consequent upon the accumulation of the secretion, together with the danger of changes occurring in the pent-up fluid, or the deposition of salivary calculus, should all be taken account of. The nature of diseases of these parts would seem to make it hardly worthy of the risk of much that might be, under any circumstances, considered liable to excite them. Here, as in every operation, great or small, the constitution and temperament of the patient will modify the course of action. If an inflammatory diathesis exists, it should be remembered, and any exciting cause avoided.

These precautions must not be understood as actuated by the slightest desire to lessen, but rather to encourage confidence, and have all duly informed so as to put forth the most intelligent efforts to keep the cavity and materials free from moisture.

To-day the profession is most united in urging upon the young the constant employment of saliva pumps, napkins, dams, etc., as essential for the attainment of the highest degree of perfection in their operations; while to these, after long and impartial trial proves them to be harmless, may be added as valuable adjuncts the various styles of compressors for the salivary ducts.

Operations upon any portion of the frame should only be performed by those whom a general education has taught to give due prominence to each of the many connections that exist between all the parts. This is pre-eminently true in the case of the dentist, who, dealing as he does with organs that hold most intimate relations with the rest of the body,

can hardly be pardoned for failing to acquaint himself with the great principles that govern the whole.

The results following a stricture of the urethra are too well understood to need description here, the unfortunate frequency of their occurrence affording abundant opportunities for actual observation. The knowledge of these facts has not deterred Nuck from applying a compressor for the relief of the inconvenience attending incontinence of urine; yet, at the present day, we seldom see it done, since other and less objectionable contrivances are used. This would seem to be a more reasonable course with the urethra than the salivary ducts, since the existence of a reservoir like the bladder removes some of the objections against the treatment. Here, however, the normal action of the sphincter of the bladder is imperfectly imitated; but in the other case a condition only found in disease is brought about.

VULCANIZERS—THE DANGERS ATTENDING THEIR USE.

BY W. H. TRUEMAN, D.D.S., PHILADELPHIA.

Read before the Odontographic Society of Pennsylvania, October 6, 1869.

(Concluded from page 572.)

And now, that we may proceed intelligibly, allow me to call your attention to this table (with which all who have anything to do with steam at high temperatures should be perfectly familiar), giving the pressure or elastic force of steam at different temperatures:

TABLE OF THE ELASTIC FORCE OF STEAM.

Elasticity of steam, taking atmospheric pressure as unity.	Temperature according to Fahrenheit.	Pressure per sq. inch in pounds.	Elasticity of steam, taking atmospheric pressure as unity.	Temperature according to Fahrenheit.	Pressure per sq. inch in pounds.
1	212°	14·7	13	380·66°	191·1
1½	233·96°	22·05	14	386·94°	205·8
2	250·52°	29·4	15	392·86°	220·5
2½	263·84°	36·75	16	398·48°	235·2
3	275·18°	41·1	17	403·82°	249·9
3½	285·08°	51·45	18	408·92°	264·6
4	293·72°	58·8	19	413·78°	279·3
4½	300·28°	66·15	20	418·46°	294
5	307·05°	73·5	21	422·96°	308·7
5½	314·24°	80·85	22	427·28°	323·4
6	320·36°	88·2	23	431·42°	338·1
6½	326·26°	95·55	24	435·56°	352·8
7	331·70°	102·9	25	439·34°	367·5
7½	336·86°	110·85	30	457·16°	441·
8	641·78°	117·6	35	472·73°	514·5
9	350·78°	132·3	40	486·59°	588·
10	358·88°	147·	45	491·14°	661·
11	366·85°	161·7	50	510·60°	735·
12	374°	176·4			

In estimating the strain upon a vessel, 14·7 pounds (the pressure of the atmosphere on the outside) must be deducted from these figures—the calculations are from a vacuum.

This table gives the results of a long series of experiments made by a commission,* appointed by the Academy of Science, Paris, by request of the French Government, to investigate this subject. Although the figures here given differ somewhat from those obtained by the experiments of others, they are considered as reliable as any. The results of no two series of experiments exactly agree. And when we consider the many difficulties encountered in making them, and the variety of apparatus used to apply, regulate, and register the heat, and ascertain the elastic force developed, and the almost endless calculation to make necessary allowance for the conduction, expansion, etc of the vessels used, this difference is not to be wondered at, nor yet allowed to throw any doubt upon the accuracy of the results obtained. They all agree upon the point that most concerns us, namely: In raising steam, the ratio of the increase of pressure or elastic force is far greater than that of the increase of temperature. The experiments were carried to twenty-five atmospheres, at which point the difficulties became so great as to put a stop to the inquiry. The rest of the table is the result of calculation founded upon the data so obtained. A careful examination of this table will show the extreme danger incurred in subjecting our vulcanizers to excessive heat, not only by the rapid increase of steam pressure, but also from the rapidly decreasing resistance of the copper, until at about 500° the pressure of the steam will overbalance the resistance of the copper, and an explosion is inevitable. The violence of the explosions reported, would seem to confirm Dr. Whitney's remark, when he says "he does not believe any severe one has occurred at a heat below 400°, or a pressure of about 250 pounds to the square inch"—nearly three times the amount they should be allowed to bear.

And now, in drawing this paper to a close, I desire to call attention to several points which I think will bear a little further examination. The necessity of *cleanliness* I do not think has been properly appreciated. I have in this box a quantity of what might, perhaps, properly

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* This commission consisted of MM. Prony, Arago, Gerard, and Dulong; the experiments were conducted chiefly by Arago and Dulong; report dated Nov. 30, 1829. For a full account of their labors, see *Annales de Chimie et de Physique*, tome xliii. page 74.

The subject was also investigated by MM. Magnus and Regnault, who, at about the same time, conducted an elaborate and exhaustive series of experiments, each working separate and distinct without any knowledge of the other's labors. As an evidence of their accuracy, the tables embodying the results are very nearly alike—more so than those of any other investigators. They may be found arranged for comparison in Gmelin's Handbook of Chemistry, vol. i. page 263. Regnault's tables may also be found in Bourne's Handbook of the Steam Engine, page 230; the experiments of the Franklin Institute Committee, Journ. Franklin Institute, vols. xvii. and xviii.

be called scale, removed from a vulcanizer which has been in use for some time; and although it has not been absolutely neglected, it has not received the attention it should. This scale I found baked quite hard upon the bottom of the boiler, and so firmly attached to the copper as to require a cold chisel and hammer for its removal. I suppose it to consist of sediment from the water, plaster, etc., which has from time to time settled and become attached as found. This scale we all know to be one of the worst conductors of heat we have; and is it not possible, notwithstanding that copper is so good a conductor of heat (standing third on the list among the metals), that this scale interposed between the water and the point upon which the flame of the heating apparatus impinges, may allow that spot to become very hot, and then perhaps, the scale being displaced by the unequal expansion, the water coming in contact with this heated surface suddenly develops a pressure that the machine is not prepared to resist? Accidents to steam boilers have repeatedly occurred from this very cause. I throw it out as a suggestion. It does not seem probable that any great difference in temperature could exist from this cause upon so small a surface of copper,—with iron it might; and yet, gentlemen, if you examine the vulcanizer from which this was removed, a small space about an inch square has every appearance of having been burned, or at least affected by the heat. This may, perhaps, in a manner be caused by the gas-jet used, a simple Bunsen burner without any gauze to spread the flame. This form is preferred by some because it is easier to regulate and free from smoke. I do not think this burning could have taken place if the water had been in immediate contact with the copper,* and if this effect could take place with a scale so thin as this, what might we expect in a machine, used as many of them are, year after year, without the least attempt being made to cleanse them?

And in this connection another idea. When a vulcanizer with its full complement of flasks is heated up to 320°, is there really any water in it? Is it not *all* converted into steam? or if not at 320°, is it not possible this may be the case at 340°, 360°, or 400°? And supposing this

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* We have on record cases where the rivet-heads have been actually melted off while the plates they held together (forming the bottom of the boiler immediately over the furnace) were undoubtedly under water and in immediate contact with it, unless from the excessive heat the water had assumed the "spheroidal" condition.

And another case where, by a defect of the draught, the flame was driven directly against the bottom of the boiler, and so heated a small portion of one of the plates. The iron was forced down by the steam pressure, forming a nipple-like projection, which in a short time would have burned off and caused an explosion. When examined after the plate had been removed, the iron was found perfectly sound; the peculiar effect could only be accounted for by supposing the iron had been locally softened by the heat.—Journal Franklin Institute, vol. xviii. p. 303.

to be the case, will the continued application of heat injure the copper more than if water were present? If this takes place, it may have saved many accidents; for just as soon as all the water is converted into steam, the rapid increase of pressure, as shown by our table, ceases; and the contents of the machine would be brought under the operation of Marriotte's law controlling the expansion of gases. I have often though that in the effort to make this instrument as compact as possible, the water space has been too much contracted. Some time ago, while using the vulcanizer in some experiments (simply as a steam generator), I found, when supplied with the usual amount of water heated up to 340°, and the steam allowed to escape suddenly through a large opening, very little water was left behind. I do not know that this really has any bearing upon the subject, and yet I think it is well worthy of your consideration.

In regard to the fusible plug, upon which we have relied so much, we have the evidence of Dr. Whitney that this part of the apparatus, unless carefully watched and often renewed, is unreliable. He thinks that frequent heating, or partial fusion, destroys its fusibility. And this opinion *seems* to be corroborated by the frequent explosions, many of which, from their violence, leave no room to doubt but that the heat was far in excess of the point at which they should have fused, or at least softened sufficiently to allow the steam to escape, in which they have remained intact. But there is another consideration. The Committee of the Franklin Institute of this city, who so carefully and thoroughly examined the subject of boiler explosions and the best means to prevent them,* while experimenting with fusible metals, composed of tin, lead, and bismuth, found that the alloys required a considerable time to change their state of solidity or fluidity: so that they may be raised, if heated rapidly, above the true temperature of fluidity; and may be cooled much below it without becoming solid. The alloy used by them gave a range of eighteen degrees, from 256° to 274°; that is, if heated up slowly it was in the same condition at 256° it would be at 274°, if heated rapidly. Their method of testing this seems to have been ingenious and accurate. The apparatus made use of was a device to give warning when the flues of a boiler became unduly heated. The metal, confined in a small cup upon a steam pipe, was melted by admitting steam, and a wire, with a small weight attached by a lever, tending to withdraw it, thrust in. The apparatus was cooled until the metal set. Steam was raised quite rapidly, or more slowly, until the wire was released by the softening of the metal. In the experiments where the wire was not released until 274°, two minutes forty-five seconds were occupied in raising the heat from the point at which the

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* Franklin Institue Journal, vol. xviii. page 298, *note*.

metal sets. We know very well, from actual experience, that with the large gas flame often used with vulcanizers, we are able to run the heat up much more rapidly than this ; and with a weak machine, the eighteen degrees, equal to a little more than thirty pounds per sq. in., suddenly applied above the point at which the alloy used is calculated to melt, would give ample pressure to cause an explosion ; and no doubt, if the heat was applied rapidly, this range might be very much extended. This peculiarity of the alloy of the more fusible metals may very often be noticed. With ordinary soft solder, for instance, the soldering iron, heated perhaps two or three times above its point of fusion, may be brought into not only direct but forcible contact with the metal, and quite an appreciable time will elapse before it gives way. The same may be noticed in Wood's metal for filling, or the solder for rubber work, in a more marked degree. Some of the cadmium alloys remain plastic through quite a long range. This, I think, is owing rather to its poor conduction than any peculiar atomic arrangement of the metal itself.

During the preparation of this paper I received from the inventor an arrangement intended to take the place of the fusible plug*—Dr. Straight's Safety Valve. This instrument consists of a brass tube or upright, half an inch in external diameter, and one and a quarter high, designed to be screwed firmly on to the head of the vulcanizer. The upper part is turned off to form a seat for the valve. The valve, made tight by a lead packing, is held in place by a rod passing through the upright drawn down by a spring under the vulcanizer top ; this rod is cut in two near the centre, and soldered together by a fusible metal melting at 355°. There is a screw-cap fitted over the valve, so arranged that when the valve is raised by the breaking of the rod, it will allow the steam to escape, making sufficient noise to alarm the operator ; after which the cap can be screwed down, bringing the valve to its seat and stopping the escape of steam, allowing the vulcanizing to go on to completion, when the rod can again be soldered and replaced. It is to be presumed the operator will keep "the fear of a blowing up" before his eyes, and not allow the heat to run up so high a second time. The price of the Safety Valve is $3 to $3.25, according to the style in which they are gotten up ; they can be placed on any vulcanizer admitting a ⅝ hole in the top.

The inventor, in a note accompanying a model of the valve, says: "The trouble with the old safety-plug was, that as only one side was exposed to the pressure of the steam, when it was heated the nature of the metal was changed by the pressure forcing the fluid part of the metal to the surface, and leaving the metal that melted the hardest next the steam pressure ; and of course the next time it was used it required

* Patented Aug. 17, 1869.

much more heat to bring it to its melting point, until finally it would not melt at all under the pressure an ordinary vulcanizer would stand. In my valve the steam pressure is alike on all sides of the metal; consequently there is no change." How far the pressure of steam may *hasten* the change which takes place in the metal, I have no means to determine; that it does not depend upon it, there can be no doubt. Time and again it has been the subject of long and careful experiment, all of which shows conclusively that fusible metal exposed for a long time, or repeatedly heated to or near its fusing point, rapidly loses its fusibility under *all circumstances*, no matter whether the heat be wet or dry, under pressure or not. If the ends of the rod were united by a link, or a rivet, or some such like device allowing more body of metal and avoiding the soldering—something inexpensive and readily renewed—it would very much increase the practical value of the instrument as a safeguard. The soldering is a decided objection: when the ends are heated and forcibly brought together, nearly all the metal will be forced out, leaving only a thin film uniting the two surfaces. The joint might be made a dozen times without any or very little new metal being added, each time making it more and more infusible; while the *cohesion* between the two surfaces would add a little to the resistance—not much, it is true—but the step between 355° and danger is a very short one. The attendant depending upon the apparatus is very apt to relax his vigilance. All taken together would make this instrument of safety one of danger.

And now a few parting words upon the thermometer. Imperfection in or injuries to these instruments are very serious causes of danger, the more so because not easily detected. And here allow me to call attention to the importance of always using the same source of heat, and observing closely the time required to raise the mercury to the vulcanizing point. If the apparatus is a fixture in a position not influenced by draughts (as it always should be), this should not vary more than a few minutes, and if watched closely is one of the most reliable checks upon defective thermometers (other than a mechanical device for that purpose). When gas is used, allowance must of course be made for the constantly changing pressure, especially in large cities. Some use a graduated cock for this purpose, but it is not near so certain as regulating the flow by the size of the flame produced; a little practice will enable this to be done quite accurately. Especial care should be used when trying a new tube for the first time; it may and often does vary ten or twenty degrees from the same maker; a good vulcanizer should be able to stand much more than this beyond the usual mark; but if a tube registering 20° slow was allowed to run up to 340° or 360°, the additional pressure caused by this error would become a very serious matter. We have already seen how rapidly the danger

increases beyond a certain point. The chief cause of the wearing out of thermometers seems to be the action of the steam, not only by its pressure crushing the bulb, but it seems to also exert a solvent action upon the glass. After one has been in use some time, it will be found to be quite rough. And in this connection I recollect the account of an experiment in which a plate of ordinary glass was suspended over the exhaust-pipe of an engine, so that the steam should strike upon the surface, and in twelve months not only was it much roughened, but it had also lost considerable of its weight. After a time the bulb appears to become enlarged, and the instrument registers "slow." Mostly in such cases, if closely examined, it will be found to be "checked," fine cracks running in every direction; but I have met with thermometers which had suffered this change, and did not show any marks of injury even when examined with a strong magnifying power. This I cannot account for, except it be that the machine had been at some time neglected until the heat had driven the mercury up to the top of the scale, and at the same time softened the glass so that the increased gradual expansion had enlarged the bulb without breaking it. As a rule, whenever the mercury has been allowed to reach the top of the tube, the thermometer should be rejected or used with extreme caution; it is a question if they can *ever* be relied upon after. When the bulb enters the steam-chamber the thermometer, even when used and guarded with proper care, gradually yet surely undergoes a change which in time makes it slow. We cannot take too much care of this our only safeguard in the absence of a safety-valve; heating up too rapidly, filling the boiler with hot water, or cooling off too suddenly, are alike dangerous, and should not be done. Those defects causing it to register too fast not being at all dangerous, only annoying, are beyond and outside our inquiry. A simple test of their accuracy is to suspend the tube in a vessel of water, taking care it neither touches the bottom or sides, and bring it to a boil; if all is right the mercury should just reach the lower mark, indicating 212°; under ordinary circumstances, water cannot be made hotter than this in an open vessel. Sometimes, when the bulb is checked, a small globule of mercury will escape, and the remaining still rise on the application of heat, giving an appearance of accuracy. The mercury-bath thermometers are no doubt much more reliable, if they are watched and the bath always kept full; if this is neglected, they are the most dangerous we can use. Never having had any experience with them, I can say but little of their performance. The heat is communicated to them entirely by metallic conduction, and it is to be presumed that this metal will always be a little in advance of the contents of the machine; and if so, any error would be on the safe side. We must also remember the bulb is placed as far from the point receiving the heat as possible, and a considerable surface for radiating heat

intervenes, while the contents of the vessel are almost in immediate contact. Where the heat is applied slowly, as it always should be (half an hour is not too long from cold water to 320°; 45 minutes or an hour would only improve the work), there is no doubt it would be accurate enough, but I have my doubts of its registering correctly if heated up rapidly.

Another source of error, especially in a large vulcanizer where the joints are all perfectly tight, is the absence of circulation in the machine after some little steam pressure has been raised. This fact has long been known, and in large machines recourse is had to pumps or other means to distribute the heat evenly throughout. It is found that as the pressure of steam increases, the conducting power decreases; the heat tends to accumulate near the point of application. Attention was first called to this, as a source of danger, by Dr. Wildman,* to whom we are indebted for much valuable information upon the subject. The doctor, on one occasion, found the thermometer standing at 320°, when, from the heat applied, he thought it should have risen much higher. On raising the safety-valve and allowing a little steam to escape, it immediately rose to 350°, or a difference in the actual pressure of 35 pounds per square inch. The thermometer is generally located not only in the highest part of the machine, but often to protect the bulb from injury, a little dome is raised up for its special accommodation, placing it entirely out of the way of any heat-currents which may be formed, and in the best possible position to be "left out in the cold." To avoid this, the doctor recommends a small valve above the bulb of the thermometer, to be occasionally opened while heating up, so as to bring the heated steam in immediate contact with it. Is it not possible, also, that the air remaining in the vulcanizer, being lighter than the vapor generated, gravitates towards this spot, and by its well-known non-conduction in a measure protects the bulb from the heated steam?

The steam-gauge, first recommended, I believe, by Dr. Lawrence,† of Lowell, Mass., has but little, if any, advantage over the present arrangement. As long as they remain in order and are carefully managed, there is no doubt they would correctly register the heat applied, and so will the thermometer. The gauge is a costly appliance, delicately constructed, liable in inexperienced hands to injury; a practical mechanic alone can repair it, and it is at best useful only to those who need it least. They frequently register from 15 to 20 pounds more or less than the true pressure, and, as I have been informed by practical men, are used more for economy than safety; enabling the engineer to approximate the pressure of steam he is using, and knowing how much is required to

* Dental Times, vol. iv. page 2.

† Dental Times, vol. ii. pages 97 and 149.

run his engine, he can intelligently regulate his fires. The inconvenience of making the attachment every time the vulcanizer is used, and keeping it perfectly steam-tight, and the constant care to preserve it from any sudden change of pressure, would overbalance any advantage they might possess. The mercury-bath thermometer would be far more reliable.

As regards the strength of the metal employed, there is no doubt it is ample to resist any reasonable strain.* The tables giving the cohesive strength of metals differ so widely, that we can hardly say exactly how much a new vulcanizer will safely bear. They have been tested up to 850 or 900 pounds per square inch, hydrostatic pressure, without injury; but we must remember that in actual use there are other causes at work to hasten an explosion besides the increase of steam pressure.

Copper loses half its strength in passing from 212° to 800,° and at the same time under the influence of heat and severe pressure it will stretch and become much thinner, and less able to resist strain. There is no doubt but that many vulcanizers explode in this way,—first bulging out or stretching on one side, the action becoming more rapid as it progresses, until the vessel is suddenly rent asunder, or "exploded," producing the torn and ragged edges we so often read of. Not only this, but allowance must be made for imperfection in the metal itself: flaws, seams, blisters, or other faults, it is practically impossible either to prevent or always discover,—imperfections, perhaps, which are only apparent under severe strain. Nor must we be misled by the very great cohesive strength the table shows the metal to possess We must bear in mind that the experiments upon which the various tables are based, were made upon bars of metal carefully selected and prepared expressly for the purpose, and which was perhaps far more perfect than a great deal to be found in the market. As a practical demonstration of the pressure a steam-tight cylindrical vessel will bear, we have two experiments by the Committee of the Franklin Institute before referred to.†

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* The Committee of the Franklin Institute give the following table showing the cohesive strength of copper at the various temperatures.

Temp. F.	lbs. per sq. inch.	Temp. F.	lbs. per sq. inch.	Temp. F.	lbs. per sq. inch
62°	31·466	492°	26·752	817°	16·727
122°	33·079	545°	25·420	844°	16·768
212°	32·187	561°	25·047	912°	14·789
302°	30·872	602°	22·302	992°	11·091
392°	26·154	692°	21·948	1016°	11·054
482°	27·081	801°	18 854	1032°	10·878

—*Journ. Franklin Institute*, vol. xix. p. 242.

The experiments by the Ordnance Department U. S. A. show the strength of copper, at ordinary temperature, to range from 22·098 to 27·729 pounds per square inch.—*Report of Experiments on Metals for Cannon*, 1856, page 281.

† Journal Franklin Institute, vol. xvii. page 223.

A copper boiler was constructed of plate ·03 inch thick, 12 inches long, by 8½ diameter, half filled with water, placed upon a furnace and heated up until it burst with great violence, splitting open in an irregular line, lengthwise, at an estimated pressure of 200 pounds to the square inch. The apparatus for registering the pressure became disarranged during the experiment, and therefore the exact force could not be ascertained. A similar vessel of iron plate, ·02 inches thick, 10 inches long, and 8½ diameter, treated precisely the same, burst at 161 pounds the square inch, as shown by the register. In both of these experiments the explosion was violent, taking place *suddenly, without any warning whatever.** Dr. Hayes, in an article, remarks "that those (vulcanizers) made of cast iron, four inches in diameter, and half an inch thick, have all remained good to this day; not an accident has occurred to any one of them to my knowledge." I recollect the introduction of the machines referred to, and if I remember rightly, they were supplied with a *safety-valve*, which will perhaps account for their immunity from danger, as much as their excessive weight of metal. Such a machine would resist a pressure of 3000 pounds per square inch. But even this immense strength would not have saved the dentist who placed his machine in the furnace, and banked the coal around it, from the just penalty of his recklessness.

As a result of this investigation, I am of the opinion that no vulcanizer can be considered safe, no matter how strong nor how well we intend to watch it, without a safety-valve. A signal-bell would be very well in its place, but if the attendant is out of the way, as a dentist in active practice may be of necessity quite often, without meriting the charge of neglecting his business, nothing would save an explosion that does not provide for the immediate release of the imprisoned force. Simply shutting off the heat is not sufficient. I can conceive, and in my reading have found instances, where the pressure has notably increased after the heat has been withdrawn. It is no excuse, that a dentist will not use or so neglect them as to destroy their value. If a dentist purchases a vulcanizer with a safety-valve, and deliberately rivets it up, or allows it to become so injured that it cannot perform its functions, he deserves to be blown up.

In conclusion,—upon inquiring of those in the fire insurance business, —I have been informed that in case of a fire caused by the explosion of a vulcanizer, there would, in all probability, be trouble in adjusting the loss, unless *permission* to use it appeared upon the policy; there would be good ground to resist the claim, if the company chose to take advantage of it.

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* Dental Advertiser, vol. i. page 1.

PROTOXIDE OF NITROGEN.

BY J. J. MENEFEE, D.D.S., SAN JOSE, CAL.

As it is seldom I see any practical suggestion in regard to the manufacture of protoxide of nitrogen, I wish to give my *experience.*

I have been using the article above named, in my practice, for the last eight months, with very marked success. For the first three months I found great trouble in its manufacture, in consequence of the breaking of retorts, and almost came to the conclusion not to use it, owing to the difficulty spoken of. But I am now using, in its manufacture, in place of glass, *a common iron retort*, and find that after five months' use, it is still giving entire satisfaction.

I can now make my receiver full of the gas (forty gallons) in forty minutes, without the annoyance of breaking a retort, and filling my office with the fumes. I am well aware that the theory is that metal will not answer for the purpose. This, however, is not so, as I have proven by fair experiment. I would, however, suggest in order to prevent rust, that the metal be lined with porcelain. I interpose a glass globe between the retort and first washing-bottle in order to retain the free nitrous acid, and also to indicate (as I cannot see the ammonia in the retort) the degree of heat to which the ammonia is subjected.

MENDING CASTS.

BY F. P. MATHER, CHESTER, VT.

For mending casts, I use collodion. Wipe the parts to be joined dry, then wet both the surfaces well with it, and place them quickly together, holding them thus for an instant. I never have success with any other than that prepared by S. S. White. I coat my casts over with it as soon as taken from the impression.

PROCEEDINGS OF DENTAL SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

A meeting was held November 3d, 1869, at the Philadelphia Dental College, the President in the chair, the room being crowded with members and students.

The subject of "Dental Education, and Where most Needed," was opened by a written essay from Dr. Eisenbrey, who did not propose to treat scientifically the subject of education, but left that to the colleges where men are first instructed in the rudiments, and from that on up

step by step until they have laid a good foundation on which to add a superstructure; but rather an embodiment of a few thoughts that have been suggested from observation and an association with the profession generally. These, when summed up, have shown that there is a marked want of solidity in the body as a whole. The title D.D.S. implies that they are surgeons (not general surgeons) as well as dentists. But how many are? If a violent hemorrhage takes place after extracting, or there is an extensive alveolar fracture from same cause, or prominent fatal symptoms from narcosis, everything is dropped, and a doctor of medicine is sent for in great haste; or, if it is known that there is likely to occur unfavorable symptoms after an operation, patients are hurriedly gotten out of the office, with instructions to call in their family physician if any untoward symptoms manifest themselves. All this is bordering on the disgraceful for us; for the whole are apt to suffer for the acts of the few. We may very often complain of the want of knowledge in our patients, when we had better turn our attention to the condition of our own storehouse, and improve that, instead of murmuring at them, which would be at the same time improving their opportunities to gain information. The blame rests with us, not with them. There are too many of us that are satisfied with, or do not know any better than to be content with, a little knowledge. Get a little and then get more as opportunities offer, until you drink deep, particularly of *dental* and *oral* surgery,—that one main branch of our specialty that has been so markedly and sadly neglected.

The ignorance that we all deplore as existing among our patients is owing, not so much to their shortcomings in reference to the knowledge of the treatment and care of their teeth, as it is to the state of affairs that exists among dentists generally, not excepting those that have the title of a graduate. A well-informed person takes pleasure in imparting what he knows to those that he is brought in contact with, while an ignorant person desires to see those that he associates with still worse than himself; hence we want real live men—not men that have a *standard*, who, after they have reached it, think that now they know enough, and may lay back in idleness,—intending to take life easy and let the profession take care of itself; but men that have for their motto, "excelsior," which motto has existed with them from the beginning of their career, and will to the end. When such is the order of the times, the cloud of ignorance that is now hovering over us will lift as rapidly and noiselessly as a fleecy mist on a bright summer's day.

For the want of proper education, a dentist does not see the necessity of instructing his patients in respect to the preservation of their dental organs, while an educated one does. Well aware that it is possible for one to be learned and still have no conscience, the question is whether one can be solidly and soundly educated without improving the feelings

of interest and arousing some kind wishes for the future welfare of the patients. This lack of interest and want of conscience exist among those where there is great room for improvement—where more light is needed.

In conversation, in societies and reports of their proceedings, in papers by correspondents, we hear repeated and read over and over again: "Educate the people; we must of necessity do that to insure success." Let me ask,—are those that preach so capable of teaching their patients properly?—there is a wide difference between teaching and acting.

To be a teacher, one should be a devoted student of the science of dental surgery—dentistry proper—and not be satisfied, as some are, after acquiring the art of extracting gently, operating skillfully, and manufacturing successfully, to start out as teachers of the community and lights of the profession. That is bringing the profession down to what it was half a century ago, making it a handicraft only. Dentistry as a science, at the present time, embraces not only skill of the hand, but a knowledge of the physiology and pathology of all the associate parts, including their microscopical structure, and their appropriate treatment, when diseased.

For some time past it has been evident that such is not our true standard or aim at the present time, for the reason that we are constantly saying that the medical profession is beginning to recognize us, which, I think, is a clear admission on our part that we are far below them yet, and that our education is very imperfect. Therefore I would say, Let us educate *ourselves* more thoroughly before we murmur at the want of it on the part of our patients. After we have done that, instead of having to send them to a practitioner of medicine for treatment when they present themselves with something out of the ordinary way of practice, we can treat and at the same time convince them that we are what we profess to be—masters of the science—and that we court recognition from no one without merit,—"For it is the men and their works that make the profession, and not the profession the men."

Excepting the few, there seems to be a disposition among us to claim all the credit and respect due to one learned, without producing any evidence or works to show the legality of our claim,—something like a person wishing to be titled without being willing to undergo the necessary training and years of toil,—or an explorer, but not willing to subject himself to the privations, hardships and dangers attending such a life. Such, it seems, is the impression wished to be made.

Some may say, Do not our labors and successes, our discoveries and their proof, on principle and analogy, prove something? Certainly they do, so far as they go, but the all-important branch of our specialty—

surgery—seems to be ignored by the profession generally. In cases of accidents, where the services of a dentist are required, as in a fracture of either maxilla, after he has made and arranged the splints, he feels that he has done his duty entirely, and then leaves the patient in the hands of a physician for after-treatment, which is the very part he ought to be well grounded in; but not being so, he *gladly* leaves the honors to some one else to appropriate, and that without a blush on his part. That, in itself, implies a want of the knowledge of the principles and practice of surgery proper, and until that is remedied, can he hope to be strong in what he is now so weak, or to occupy an equal position with those who take up such cases and carry them through? The doctor of dental surgery is the proper one, as the title implies, to have the entire control of all that pertains to his specialty—dental and oral surgery, and diseases of surrounding parts. But how few there are in the ranks that will undertake to treat or remove even simple cystic tumors, engorged antra from alveolar abscess, salivary fistula, ranula, calculi in salivary duct, odontocele, alveolar necrosis, etc., etc.! Most of these are simple in their character, and the treatment plain, though the main thing to do is to note the symptoms and meet each indication as it presents, which prescribes the treatment. How many are there in the profession that will assume the responsibility of such cases? Leaving out those that have a medical education, not one per cent.! Self-consciousness of unfitness! Who is to blame? Certainly not our *alma mater*, for she gave us every opportunity, and urged and begged us to accept the offering and improve the time. No, we were satisfied with a smattering that barely passed us at the faculty examination, and then went forth claiming to have the knowledge and deserving the respect that the degree entitles us to. It cannot be that all who enter our ranks are capable of advancing *only* so far, and not able to meet with success as surgeons.

There is an indifference manifested by us as a body,—excepting the few workers,—that does not augur well for our future advancement. Let us all share the toils of the whole, and not be content to settle into the groove that carries us down instead of up the hill of science. There is no such thing as standing still: we must either advance or retire.

It seems to be the opinion of some, that dentistry affords a field wherein they can live a life of luxuriousness and ease, without a corresponding outlay of force, either mental or physical. Such are drones and obstacles in the way of others, by which, until they are removed or aroused from such an indolent state, our onward march is greatly impeded. This indifference to the importance of a surgical education seems to be manifested by our societies in general,—National, State, and Local,—if one may judge by the proceedings and reports of such bodies. Would it not awaken an interest among us if the subjects

were introduced for discussion in our societies, of operations for cleft palate, on tumors osteal and carcinomatous, when destruction of hard palate has taken place, necrosis of maxillary bones, deep-seated and complicated injuries, with history of cases and the treatment to their end, be it a success or a failure, instead of describing the small circle that we do year after year? Now, as heretofore, the same old subjects are given to us, year after year, to be discussed and then laid aside, but to be re-exhumed at the next meeting and discussed *ad infinitum.* Let the field of oral surgery, which is the most glorious and difficult of all surgery, awaken and interest our hearts and minds; then we will have no monotony as now, but will always have something new; for year after year in the ground that has to be traversed in the pursuit of surgical knowledge, there is no set routine such as we have in the daily practice of our office and laboratory. We cannot wonder that there is a want of interest manifested, when the same old subjects that have been almost exhausted are again offered to us for digestion. What we want is a change of base. "Variety is the spice of life," while repetition is tiresome. Up to the present time the most important part of our profession has been inexcusably neglected.

From now on let us profit by the opportunities that are within our reach (I refer to a work on oral surgery just published), and be prepared for any emergency,—

> "A little learning is a dangerous thing;
> Drink deep, or taste not the Pierian spring."

We may complain of not having an opportunity to treat such cases; well, that may be; but, let me ask, how many are prepared to treat such on sound and correct principles, if they should offer? Not one per cent.; then, should we wait for a case to present before preparing, or be ready when one should come?

If we are not frequently consulted in reference to such cases now, there is no telling how soon we may be, for as time advances, and our associations increase, our status in the professions and community, if we are deserving, keeps pace; therefore, let us seek for that knowledge that will keep us ever ready, and not only maintain, but exalt the honor of our calling.

It is of more importance that we be educated to a high standard than our patients; for that which we are remiss in there is no excuse, but for our patients there is,—for they depend on us for what they know and what they learn. We can offer no excuse when we have the opportunity of attending the lectures delivered at our well-conducted dental colleges, where the subjects of our specialty are well digested, and then offered to us. So that, if we wish to be well grounded and solid in the principles and practice of dental surgery, we can be; or, if we are

satisfied with a smattering, and let what we hear go by unheeded, the blame rests not with our patients, whom we complain of for ignorance, nor our colleges, but with us alone.

This indifference not only reverts to our own disadvantage, but also to the institutions of which we were students, for they are judged by the laity just as a tree is known by its fruit. Let our status rest on true merit, and make that merit of a rare quality.

That such a deficient state of our education does exist, is evident on all sides.

Let us stimulate each other to shake off our indolence and self-ease, or rather indifference and laziness; go to work with new zeal and energy, and with "excelsior" for our motto, and our aim high, we will surely be victorious in our onward march, and leave behind us—

"Footprints, that perhaps another,
Sailing o'er life's solemn main,
A forlorn and shipwrecked brother,
Seeing, shall take heart again.

"Let us, then, be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait."

There is one department in our specialty that is being pushed forward with a zeal that should characterize it as a whole,—one that requires both the finest kind of manipulative skill and a high degree of intellectual ability. It is the department of microscopy. In that it is making rapid strides; would that the same influences and energy that are there displayed could extend to the other branch (surgery), that it might be practically and daily illustrated among us; then we would not have to call on the general practitioner for assistance when a difficult case presents, with all its complications, for treatment,—nor would we be beholden to the medical profession for the standard works of our own specialty, as we now are.

What we want are works written by our own fraternity; then we can take and maintain a position independently of any one, and not have to proclaim to the world the dignity of our profession, and that we are being recognized. Let us give no cause for self-accusation, but conceive and bring forth.

It is a marked feature in practice, that as you have a high degree of knowledge, so your patients keep pace with you, and *vice versa.* Who ever saw a high-toned, first-class gentleman with a set of ignoramuses for patients? or who ever saw an ignoramus with a class of delicate and refined patients? Our patients are a true index of our character and abilities.

Right ourselves where the trouble really exists, and the other error will correct itself instantly and naturally. Let us, then, be more exercised about educating ourselves than about educating our patients,—as we say,—up to a certain standard.

Dr. Kingsbury said the patient should be taught by the dentist, and the scarcity of popular information upon this point was a matter for regret. The operator should be a man of taste and discrimination. He could not subscribe to all expressed by the essayist. By the term education, we understand the process by which the intellectual faculties are developed and cultivated. It is the preparation for after-life. He felt there were great deficiencies often in the preliminary education, both of the students of medicine and dentistry; those necessary for the former are equally important to the young men who would study dentistry.

The senses are the avenues of knowledge to the mind, while reading and writing act as vehicles for the conveyance of ideas; hence a thorough acquaintance with these through a good English education is needed.

Natural history was the first step in the education of Adam, and after distinguishing the differences in the various animals, he proceeded to name them.

Many instances of the meanings of words in his system of nomenclature might be named, but one was sufficient—as woman, bone of my bone, because taken out of man; hence etymology is a concurrent study.

Latin and Greek are useful to us as studies, since they are the foundation of some of the modern languages, and in them we find the etymology of the names of anatomy, etc. A little knowledge is far better than none at all, and a few months' study of these languages would help the student of our science materially.

The foundation study of dentistry or medicine is Anatomy. Osteology is first taught as the framework of the body upon which the muscles, arteries, veins, lymphatics, nerves, viscera, etc., with all their various ramifications, are supported.

Following anatomy, which treats of organology, we have Physiology, describing their functions or actions; Pathology, which imparts a knowledge of the two former when diseased; Therapeutics, the treatment of the latter condition and how to relieve pain, and, if possible, restore to health; while Materia Medica is the study of the materials employed; Pharmacy is the art of choosing and preparing the medicines; Hygiene assisting therapeutics and giving the healthy rules by the observance of which to avoid sickness. The Institutes of Medicine constitute the general theory of the above relations, etc.

Anatomy may be divided into General and Microscopical, or Histology.

He then spoke of the encouragement dental colleges had met with, and how their graduates are received upon returning to the fields of their labors, especially those who have for some time been known and practiced as dentists. He had within a few days received a letter, one among the many, speaking of the increase in practice and confidence of the patients.

In conclusion, he felt it was one of the greatest boons any one could ask for to be a young man in this age of free education.

Dr. Trueman could not agree with all the remarks of the essayist. He notices a tendency in the profession to run off into medicine and surgery. He thought, as dental surgeons, we had better confine ourselves exclusively to the teeth. There is enough yet to be learned about them to employ all our time. It is the duty of the dentist to make himself thoroughly acquainted with the mouth and its surroundings, both in health and disease; he should be able to accurately locate every important artery, nerve, and vein, in these parts, and to have a general knowledge of the anatomy, physiology, and pathology of the entire system; but did not think it was his imperative duty to practice either medicine or surgery, simply because the parts diseased were within or adjacent to the oral cavity. The dentist might thoroughly understand the disease, the parts to be operated upon, and the nature of the operation to be performed; but not having the constant practice necessary to handle the scalpel with skill, would be very apt to fail where the accomplished surgeon would succeed. Brain knowledge is not enough; the hand also must be educated; his observation must be cultivated; he must learn in the school of experience the sequel to those lessons he has learned from his books. There is a limit to the "grasp of intellect." But few men have the capacity to be dentists and surgeons; they must either be one or the other, or botches at both. We cannot expand and concentrate the mind at the same time. Some men of comprehensive mind have so educated their mental faculties, hold them so completely under control, that they can direct them wherever they please, at will. Such men are exceptions rarely met with, and should not be set up as patterns for ordinary mortals to follow; "they grasp at the stars, and stick fast in the mud." It is far better to do one thing *well*, than try at a dozen and fail.

Dr. Boice was pleased with the essay, and thought we should advance as a body. A dentist should not be confined to plugging teeth,—he should be able to treat them, and of necessity if he sets a fracture, he should be the one to treat the case. In this opinion he was confirmed by comparing the profession as it had been with what it now is.

Mr. Lyder, as a student of the science, could but subscribe to the

remarks of the gentlemen in favor of advancement; and for one, he desired that the standard of dentistry should be raised to include such general knowledge as was required of the physician and surgeon, with the special ability of the dentist superadded.

Dr. McQuillen said that, for more than twenty years, with voice and pen, he had constantly advocated self-culture in science, in art, and polite literature, on the part of dental students and practitioners, as the only effectual method for the advancement of the individual and the profession to a position which would command the respect of those engaged in the practice of the learned professions of law and medicine, and persons of education and refinement generally. In doing this, he recognized that as men differ in physical capacity,—some being strong, and others weak,—so, in mental capacity, the greatest diversity exists, from minds apparently capable of grasping everything, to those possessing but a single talent. Those most remarkable for their mental culture, however, will admit that they know but little in comparison with what there is to know; a man with but a single talent, who has acquired a knowledge of a few things, is a more useful member of the community than he would have been without it. A little learning is, truly, far better than no learning at all; and there is good common sense and excellent advice in what Sydney Smith (one of the most witty, powerful and brilliant modern British essayists) has somewhere said: "Have the courage to be ignorant of a great number of things, in order that you may avoid the calamity of being ignorant of everything." In this age, when every department of science and art is cultivated with the most marked assiduity and devotion, discovery after discovery succeeding one another with such rapidity that to remember the mere names is a tax upon the memory, one is compelled to confine his attention to a few things, if he desires to be of use in contributing his share to the knowledge and comfort of mankind. The true scholar ever aiming at spherical mental development by endeavoring to acquire a knowledge of the great principles underlying all the sciences and the arts; having gained that, and recognizing the impossibility of mastering the details of every department, then devotes himself to some special field of labor and is content to make fractional additions to the general stock of knowledge. These original fractional contributions, although individually small, form in the aggregate the vast storehouses of the sciences and the arts from which their principles or laws are evolved. Applying this to medicine, we find that men who, after gaining a spherical development, have devoted themselves *exclusively* to some specialty,—anatomy, physiology, chemistry, practice of medicine, obstetrics, surgery, and its subdivisons, syphilology, ophthalmoscopy, laryngoscopy, auroscopy, etc.,—have not only obtained most important results in the acquisition of *exact* knowledge in place of vague conceptions, but in addition

established reputations which have drawn to the schools with which they have been connected students from distant lands. Thus it is not an unusual thing for the young graduate of American medical colleges to seek in the universities of Edinburgh, London, Paris, Vienna, Berlin, Munich, etc. the knowledge there imparted by *original investigators* and *practitioners of specialties.* To be the mere mouth-piece of other men is one thing; to observe and teach from nature is another.

What has carried the practice of dentistry to its advanced position in America, and given to the name of American dentist such prominence in Europe? Is it not due to the fact of being taught and followed as a specialty, even subdivided into operative and mechanical dentistry, and pursued singly, by those desirous of securing the most perfect results? What has induced these gentlemen, who, honoring our society with their presence, crowd this room to-night, to leave their far-distant homes?—coming, as they do, not only from every quarter of our own wide-spread country, from the lakes on the north to the gulf on the south, from the shores of the Atlantic to those of the broad Pacific, but in addition from the tropical regions of South America and Cuba, from the verge of the frigid zone, Canada, Nova Scotia, Norway, and Russia, from the base of the snow-clad mountains of Switzerland, from the shades of time-honored German universities in Vienna and Berlin, and from old England; many of them graduates of medical and dental colleges, practitioners of several years' standing, men of matured experience, gathered here from everyquarter and every clime, until the assemblage assumes almost the character of an international dental congress. Why are they thus assembled? They come as students under the conviction that they have entered an institution devoted to teaching the specialty of dentistry, where every department of science, taught in its walls, is made subservient to the end in view; and in which the acquisition of knowledge and skill on the part of the student is esteemed of more importance than the mere possession of a diploma. Does this not indicate an appreciation of special instruction? The student of dentistry, like the medical student, should have an education fitting him for any department of practice: if he elects to combine oral or general surgery with that of dentistry, no one should say him nay; at the same time, if he chooses to confine himself exclusively to the preservation of the natural organs, or the construction of artificial substitutes, let not another who assumes a wider range regard him as open to censure for thus limiting his operation.

Dr. Stellwagen had so recently expressed his feelings with regard to this subject of dental education, that he could not now expect his hearers to be interested in a mere repetition of the same; it would be sufficient for him to say, that he most heartily approved of advancing in all directions, but of all that of surgery was seemingly the most legitimate for

the dentist; his hands are accustomed to the use of instruments, and few physicians or surgeons can arrive at such perfection of touch as the long and constant practice of the dentist brings him. The ability to judge of the condition of parts at the extremity of an instrument, simply by the sensation conducted by this as a medium, is one only gained after continued attempts.

Dr. Trueman exhibited and explained the operation of J. A. Straight's safety valve for vulcanizers; and also read a letter from P. H. Gish, of Janesville, Wis., who was severely injured by his vulcanizer exploding (reported in the DENTAL COSMOS for July, 1869). The latter writes, "The accident was caused by the *threads on the brass cover giving way;* the boiler not being in the least injured, and it is still in use with a new cover on top." He has fully recovered, and attends to his business as before the accident.

The doctor remarked that, after reading the account of the accident, he thought from the nature of the injuries it would be useless to write to the gentleman himself for particulars; therefore he directed his note to Dr. Harvey, the attending physician, and was agreeably surprised to hear that Dr. Gish was alive and well.

Mr. Lyder had had a vulcanizer explode, while he was called from attending to it, which blew out a window in his laboratory with a terrific report. It was a Hayes oven; it separated into twelve pieces.

Adjourned.

EAST TENNESSEE DENTAL ASSOCIATION.

THE East Tennessee Dental Association met at Knoxville, Tenn., Oct. 20th, 1869, the President, Dr. John Fouche, in the chair. Several new members were elected. The increase in members, both upon the rolls and in attendance, shows a growing interest in the objects of the association.

An interesting paper on "Hemorrhage after Extraction" was read by Dr. Wm. F. Fowler. The various remedies and means for arresting the same were discussed.

Interesting and instructive clinics were held by Dr. J. F. Cazier and Dr. John Fouche. Discussions followed upon the various methods of treating superficial decay, removing salivary calculus, different methods of filling teeth, etc.

Two valuable essays were read by Dr. Wm. H. Cooke—one on "Necrosis of the Alveoli," the other on "Tumors of the Mouth."

Dr. Cazier drew up and presented to the Association a bill, memorializing the Legislature of the State of Tennessee to pass the same for the better regulation of the practice of dentistry in Tennessee.

Drs. Fouche, Cazier, and Cooke were elected to represent the Associa-

tion at the next meeting of the American Dental Association, which meets in the city of Nashville.

Drs. Fowler and Speck were elected to represent the interests of the same, at the next meeting of the Southern Dental Association, at New Orleans.

After electing the following officers for the ensuing year, the Association adjourned:

President.—J. F. Cazier, D.D.S.

Corresponding Secretary.—Wm. F. Fowler, D.D.S.

Recording Secretary and Treasurer.—Wm. H. Cooke.

WM. F. FOWLER,
Corresponding Secretary.

CUMBERLAND VALLEY DENTAL SOCIETY.

CARLISLE, Nov. 16, 1869.

A REGULAR meeting of the Cumberland Valley Dental Society will be held at Mechanicsburg, Cumberland County, on Thursday, December 9, at 1 o'clock P.M.

An essay will be read by Dr. J. W. Bender, of Shippensburg, on the "Extraction of Teeth."

The subjects for discussion will be, "Use of the File in Superficial Caries," "Preservation of the Deciduous Teeth," "Recedence of Gums," and "Absorption of Alveoli."

Other matters of importance to the profession will be attended to.

All are earnestly requested to attend. Report to Dr. J. C. Miller.

GEO. W. NEIDICH,
Corresponding Secretary.

EDITORIAL.

NEW YORK COLLEGE OF DENTISTRY.

IN a letter received from Professor Frank Abbott, he says that this institution will resume its labors on the fifteenth of November. There is no reason why New York, which claims to be the metropolis of the country, should not have a Dental College, if the right kind of men can be induced to co-operate harmoniously and make the necessary sacrifices demanded of such an enterprise. The fourth annual announcement came to hand as the magazine was going to the press.

BOSTON DENTAL COLLEGE.

THE second annual announcement of this institution has been received, along with the following notice.

Session 1869–70.

Lectures commenced at this college on Wednesday, 10th instant.

It is thought advisable, in accordance with the usages of other colleges, to adjourn over Thanksgiving week.

Lectures will be resumed on Monday, the 22d instant, at seven o'clock P.M., to continue daily through the term.

BOSTON, Nov. 11, 1869.

The difficulties surrounding these two institutions appear to have been adjusted, and it is to be hoped, for their own sake and that of the profession, that they may escape similar experiences in the future.

J. H. McQ.

DR. WILLIAM REYNOLDS.

"THE conditions on which the privilege of replying to the proceedings of the Odontographic Society of Pennsylvania, as published in the February number of the DENTAL COSMOS, was conceded, were such as to induce a postponement of an answer until a more favorable opportunity and circumstances should present themselves."

The above extract, from a letter of Dr. Wm. Reynolds, in the October number of the *American Journal of Dental Science*, seems to demand a brief notice on account of its implied charge of unfairness. The facts are these: In the DENTAL COSMOS of December, 1868, a communication from Dr. Reynolds of over three pages appeared—in examination of a report of the Committee to the American Dental Association—devoted to a defense of his *patented* improvement. It was thought of doubtful propriety at the time to publish such an article, as it seemed to belong more properly to the advertising department; but as his article was in reply to criticisms which had been published, Dr. Reynolds was afforded a hearing.

Subsequently, a report of the proceedings of the Odontographic Society of Pennsylvania was published in the February number of the DENTAL COSMOS, containing criticisms and references to his improvement. A short communication from the doctor, which he himself thought would likely be considered as belonging to the advertising department, in answer to these strictures, was published in the April number, and the question was asked if further communications would be received, to which reply was made as follows:

"In reference to further communications upon the subject of your improvement, both sides have now been heard, and we shall have to request that articles on either side be brief."

This was the "conditions on which the privilege of replying was conceded." SAMUEL S. WHITE.

PUBLISHER'S NOTICES.

CLOSE OF THE VOLUME.

THIS number of the DENTAL COSMOS completes the XIth volume, and fills our engagement to those who have subscribed for it. We send bills to those whose subscriptions have expired, with the request that such as contemplate renewing them will do so promptly, in order that we may determine the number of copies to print, and that those who desire may be certain of securing complete files of the journal.

The first number of the XIIth volume will be published January 1st, 1870, and succeeding numbers on the first of each month following. Diligent efforts will be made to increase its usefulness, and to make it a practical exponent of the science and art of dentistry. We most earnestly solicit a continuance of the favors of the friends of dental progress, by subscription and by contributions to its pages, and also ask their aid to extend its circulation in the interest of the profession and of science,—that, by the combined efforts of publisher, editors, patrons, and contributors, we may enhance its usefulness and make it indispensable to every practitioner. We also urge upon every one who has not heretofore been a subscriber, to try it for a single year, and see if it does not many times repay its cost. In a word, pledging ourselves to renewed exertions, we invite the co-operation and support of all who desire the elevation of the profession. We shall, as hitherto, adhere to the system of cash payments in advance, experience having shown that in no other way can heavy loss to the publisher be avoided; and, moreover, it is appreciated and prized most when promptly paid for.

SAMUEL S. WHITE.

PREMIUM FOR SUBSCRIPTIONS.

A Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts. By James E. Garretson, M.D., D.D.S., Late Lecturer on Anatomy and Surgery in the Philadelphia School of Anatomy; Late Professor of the Principles and Practice of Surgery in the Philadelphia Dental College, etc. Illustrated with Steel Plates and numerous Wood-cuts. In one volume, octavo, 700 pages. Fine toned paper. Handsomely bound in cloth. Price $7.50.

Desirous of extending the circulation of the DENTAL COSMOS, we offer as an inducement to solicit subscriptions, a copy of the above volume, postage pre-paid, to any one who will send us a club of six *new* subscribers for one year, accompanied by the cash for the full amount of the subscriptions—viz., $15.00.

The following notices of Dr. Garretson's work we take from recent issues of the publications to which they are credited:

"In this volume Dr. Garretson has summed up the results of an experience of unusual extent, and has erected a permanent monument to his industry and skill. The author goes into his subject with exhaustiveness, and does his part well."—(*Med. and Surgical Reporter.*)

"The author does both himself and his subjects most ample justice, and the work must prove very valuable to both the dental and medical profession."—(*Buffalo Medical and Surgical Journal.*)

"A glance at the headings of the forty-two chapters of this work will abundantly convince the reader of the great importance of the several subjects treated, and reading of the text will demonstrate that the author has accomplished the task proposed with consummate ability and fidelity. No dental surgeon can consider his library complete, or himself fully 'posted,' without this invaluable book. It is the most scholarly and at the same time practical exposition of the general subjects treated upon, that it has been our fortune in a long time to meet, even if it has ever been equaled. But it is by no means to be restricted in use and value to our *confreres*, the dentists. Aside from its discussion of the pathology and therapeutics of the teeth, about two-thirds of the space is devoted to elucidation of disorders topographically associated, and here the most accomplished surgeon will find much to interest and instruct. We are especially pleased with the multitudinous new and beautiful illustrations afforded. We do not hesitate to say that in this respect the book equals, if it does not surpass, any professional book up to this time issued from the American press. It affords us unusual pleasure to advise each of our readers to buy, read, and rejoice over this really *new* book. We congratulate the author upon its undoubted immediate popularity and success."—(*Chicago Medical Journal.*)

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN. New Series. Vol. I., Nos. 1 to 6. London: Printed and published for the Society.

In a preceding number of the magazine, acknowledgment was made of the reception of the Transactions of the Society, which are now published in monthly parts. Since that, several additional numbers have come to hand, although by some derangement those which came last preceded the others in time of publication. The papers and discussions presented in these numbers are of much interest. The subjects are as follows: "Plastic Stoppings," by Mr. Laurie; a report on the "Value and Advantages of the Protoxide of Nitrogen as an Anæsthetic in Dental Operations," by Mr. Wm. A. Harrison, in which the claims of this valuable agent are presented after having been duly tested at the Dental Hospital, where it was administered 1380 times by the officers of the institution; a paper "On the Formation and Arrangement of a Dental Museum," by Robt. T. Hulme, M.R.C.S.; and, lastly, a communication on "The Comparative Value of the Materials used in Taking Impressions of the Mouth," by H. E. Sewell, Esq., M.R.C.S., L.D.S. All these topics were ably handled, and in keeping with the elevated and practical character of the organization; which may justly claim to be a live society, having no superiors, and few if any equals.

BRITISH JOURNAL OF DENTAL SCIENCE

The publisher and editor of this magazine have made arrangements by which it will be regularly forwarded in exchange for the DENTAL COSMOS, and extracts from its pages will be made from time to time so as to keep the profession in America informed of the doings of our English brethren.

In the October number, it is stated that the first meeting of the Odontological Society of Great Britain, for the session 1869–70, will take place at 8 o'clock, on Monday, November 1st, when Mr. Mummery will read a paper "On the Evidences of Dental Caries among Ancient Races of Mankind, and existing Savage Tribes."

It is also announced that Frau Henrietta Hirschfelt, D.D.S., has, by permission of the Prussian Government, commenced practice as a dentist (for women and children) in Berlin.

ATLAS TO THE PATHOLOGY OF THE TEETH. Arranged and Explained by the late PROF. DR. M. HEIDER and PROF. DR. C. WEDL. Parts III.–IV. Leipzig: Arthur Felix, Publisher.

These are the concluding portions of a work which has been favorably

mentioned in preceding numbers of the Dental Cosmos. The illustrations in these parts have been executed with the same care as those in the first. The text accompanying and describing the drawings is in German and English for the following reasons, given by Prof. Wedl: "Considering the high cultivation of practical dental science in England and the United States, I thought it advantageous to the interest of the publisher to translate the letter-press into English."

Placed as the German and English texts are, side by side on the same page, the work is made doubly valuable, first, on account of the subject-matter, and second, as affording an excellent opportunity of studying the German language.

Prof. Wedl further states in the preface that "the present Atlas is intended both to illustrate the Pathology of the Teeth, to be published, it is hoped, in the course of next year, and to serve as an independent work. The method now pursued in natural sciences of giving the representations a well-defined direction by connecting figure and word, of guiding the idea and conception in the right paths, and of thus introducing the student *in medias res*, is no doubt fully justified; which is proved by its being cultivated more and more in those sciences. A more rapid and accurate comprehension of what is represented, as well as a saving of time and space, are the fruits of that method, the seemingly greater expense of which is amply outweighed by the advantage."

This work is commended to the profession in America as a most valuable addition to dental literature. The illustrations accompanying the text were all drawn from nature, expressly for this work, by Dr. C. Heitzman, who, in addition to being an excellent artist, as a graduate of medicine and a microscopist, is thoroughly conversant with the tissue which he delineates. J. H. McQ.

A Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts. By Jas. E. Garretson, M.D., D.D.S., late lecturer on Anatomy and Surgery in the Philadelphia School of Anatomy; Late Professor of the Principles and Practice of Surgery in the Philadelphia Dental College, etc. Illustrated with Steel Plates and numerous Wood-cuts. Philadelphia: J. B. Lippincott & Co., 1869.

In submitting a work to a critical examination on the part of an editor of a magazine, it is but natural that the author and publishers, satisfied of its merits and claims (the consciousness of which prompted the publication), should anticipate, indeed desire, a favorable notice of its contents. Nor is it at all surprising that the most just and liberal criticism should sometimes induce a feeling of disappointment, tinged with resentment, on the part of the author when he finds the labor of months

or years, which he has fondly regarded as perfect in its descriptions and exhaustive of the subject, under the analysis of another mind open to objections of the most decided character.

In the performance of his duty a reviewer must be just to his readers, to the author, and last, though not least, to himself. In doing this, however, his position is by no means an enviable one; for in the faithful and conscientious discharge of duty he may evoke antagonisms of the most bitter and unrelenting character; yet the best friend of an author is the critic who points out the defects in his work, and thus enables him to improve the subsequent editions; for no book ever came from the press entirely free from error, or to which no exceptions could be taken. At the same time, it must be admitted that a critic is as liable to make mistakes as an author, and points to which he may take exception may prove in the end well founded in reason and unmistakably correct. The success of a book does not depend entirely upon its merits, for many a good book has fallen still-born from the press, and no greater misfortune can befall an author than *silence* on the part of editors. Far better to be censured than not mentioned at all. Dr. Johnson has not inappropriately compared an author in the hands of reviewers to the game of shuttlecock, in which the object is maintained in view by being driven backward and forward from battledoor to battledoor, and falls to the ground when let alone. Laudatory and even fulsome notices, evincing little or no knowledge of the subject treated, may be exceedingly gratifying to many authors, but they never satisfy a properly constituted mind or carry with them any weight with intelligent readers; while a review, in which not only the merits of a work are fully recognized but its shortcomings pointed out, awakens attention and excites a desire on the part of others to possess and examine it.

Animated by considerations such as these, the attention of the reader is invited to a brief analysis of the above work, which—embodying the observations and experience of one who, as a student, practitioner, and teacher, has devoted a number of years enthusiastically, untiringly, and successfully, to the study and treatment of the surgical affections of the mouth—could not but prove what it is, a valuable work to the surgeon, whether engaging in the general operations of surgery or confining himself to the specialty of dentistry.

The work opens with the surgical anatomy of the mouth and face, in which the bones of the face and surrounding soft parts are most satisfactorily and comprehensively described. For reasons best known to himself, however, the author has presented, neither in this nor any other part of the work, a general or microscopical description of the teeth. This cannot but be regarded as an oversight in a treatise of seven hundred pages, in which the affections of, and operations on, these organs are described. The anatomy and physiology of the fifth pair of nerves next

claim attention. Then follows a chapter on Dentition, in which, after some extracts from the works of Goodsir, and Todd and Bowman on this subject, the author makes the following remarks:

"These are the views of development entertained by the authors above quoted. Investigations which I myself have made in this direction, have seemed to simplify the matter very much, and, indeed, to deprive it of a very great share of its obscurity. Whether these views may be nearer right than the various others held, the reader may for himself determine. At a certain period of fœtal life a groove is observed, the progressive development of which proves it to be the primitive dental groove. This groove is lined by a delicate membrane continuous with the mucous membrane, and perhaps a part of it—modified, but still a part of it, just as the conjunctival cells which pass over the cornea are really part and parcel of the common ocular conjunctiva. This membrane, at points corresponding with the position of future teeth, is elevated into papillæ or little hills. A section through the membrane, over any of the bulbs, exposes a papilla. This papilla or body, closely examined, is found to be made up of a congeries of granular nuclei, dispersed irregularly through a firm homogeneous blastema. This papilla is the rudiment of the future tooth, as observation of its development proves. It is not inclosed in a cell wall, or membrane of its own, but is a kind of hyaloid structure or substance. The papilla, thus understood, is seen to lie beneath the mucous membrane; and in this membrane resides a certain amount of elasticity. As the papilla enlarges and projects itself, it becomes inclosed to all the extent possible with the mucous membrane contracted about the body so as to constitute a sac or cell wall, just precisely as the parietal peritoneum contracts about and makes a sac to the projected intestine in hernia. This sac enveloping the papilla has its continuation, as is seen, necessarily over the sides of the groove; as when this groove enlarges and deepens, and finally envelops the papilla, it is seen that the body or tooth germ gets a second sac. It is as though one should envelop his head in a double nightcap, and then bind over this a handkerchief—the submucous structure of the lateral walls and operculum representing the handkerchief.

"At this period the pulp or original papilla having attained the size of the tooth it represents, commences the process of the formation of dentine. Before the attainment to full size of the papilla, there existed between it and its sac proper a halitus or fluid. This halitus, now that the congeries of cytoblasts or nucleated granules have obtained their full growth and secretive power, is replaced by a more highly endowed secretion, the work of these matured cells. This secretion, deposited against the inner sac, or between it and the pulp, contains the elements of the dental structure—is, indeed, the dentine, and deposits layer after layer, supported by and moulded into form by the sac. As this deposit intrudes on the pulp, so this body contracts within itself, until, finally, by some law of nature, it stops at that certain point which maintains within the tooth a canal or cavity, and a vascular and nervous pulp to occupy it,—this pulp being the contracted original papilla; the vessels of this papilla being vessels entirely analogous to any one of the ordinary papilla of touch, so supplied and so maintained.

"Why this secretion, in its organization, should assume the position of the elongated tubular cells which pertain to the structure of dentine,

I have, of course, no idea, and it is quite enough for our purpose to say that it is a law of life perhaps never to be comprehended on this side of eternity, and the discovery of which would, at any rate, have but little practical signification to us. The formation of the dentine completed, the covering of it with enamel begins, or rather this deposit is, to a degree, coincident with the dentinal formation. Secreted by the same pulp which formed the dentine, the same secretion, some portion of it finds its way into and through the primary sac. As it passes through this sac it is modified—receives new elements, perhaps, which, as it is received into the second space, or the space between the first and second caps, and its calcification commences, impresses upon it the arrangement of its particles after the hexagonal order of the enamel: Between the enamel thus formed and the dentine exists the primary sac; simply the originally modified mucous membrane, which we first saw as overlying the papilla. This membrane continues its existence between these two hard bodies, and receives and modifies, for the support of the enamel, the liquor sanguinis sucked out from the dentinal tubules and intertubular structure. It may be called the enamel membrane.

"It has of course been much modified, and it is from it that we receive the impressions of pain when it is exposed by a break in the continuity of enamel.

"The growth of the root of the tooth, so far as its dentine is concerned, has precisely the history of the body. It is associated with the pyramidal elongation of the papilla or pulp, which, pushing upward the crown, elongates upon itself the enamel membrane.

"This elongation, with a greater vascularity and vitality assumed by the membrane as it approaches the basement vessels, modifies again the result obtained by the secretion passing through it from the dentinal pulp, the result being a nearer approach to true bone in the production of cementum. The periodonteum is simply the modified external sac, lost of course above the neck as the tooth has emerged through it.

"This is a very simple and easily understood explanation of tooth growth. The observations leading to the conclusions were somewhat extensive, and, to my mind, the phenomena are indorsed by general physiological analogy."

With due respect to the author, the above explanation of the formation of dentine, enamel, and cementum appears open to very decided objections. At the same time, while offering exceptions to the views advanced, the writer of this article frankly admits that, although he has devoted some attention to an examination of the fœtal jaws of man and animals, and is at present thus engaged, his opportunities for such research have been so limited, that his opinions are mainly based upon the recorded observations of investigators the accuracy of whose statements have not as yet been called into question.

In speaking of the extended observations on which his views are based, the author has not mentioned the course pursued in conducting the investigations; stated whether they were made upon the fœtuses of man or animals; nor whether the work was accomplished with or without the aid of the microscope. These are important matters, when histologists very properly demand not only accurate observations, but also

the record and demonstrations, and regard the most plausible hypothesis, unsupported by such data, as but "the baseless fabric of a vision." It may be said that the actual molecular change taking place in the development, growth, and nutrition of tissues is not an object of microscopical observation. While this may be true, and the direct conversion of the proximate principles of the blood into the tissues proves such a subtle process as to be apparently incapable of detection and demonstration, even with the aid of the most perfect optical instruments; yet the various stages of the development of tooth structures in the fœtuses of man and animals are so well marked, that they afford the most ample opportunity for the employment of the microscope. As well might one assume to predict the appearance of a new planet without a nightly examination of the stars with the telescope, as to offer in this day a satisfactory explanation of the development of tissues, unless predicated upon carefully conducted microscopical examinations.

When Le-Verrier confidently announced to the world that at a given time, in a certain portion of the heavens, a new planet would be seen, it was not the mere intuitive inspiration of genius, but due to extended and unwearied observations of the heavens, in the course of which perturbations noticed in a visible star could only be accounted for in his mind by the proximity and influence exercised by an invisible planet, which, according to his careful and laborious calculations, would and did become visible at the time and place named by him.

Unless the description given by the author, therefore, of the formation of the dental tissues, is based upon microscopical observation, his statements must necessarily be received *cum grano salis*, at least by inductive minds. There is not only a decided diversity of opinion between him and other observers who have presented detailed descriptions of their investigations, but in addition a most remarkable prominence is given to the dental pulp, as the formative organ of such diverse structures as dentine, enamel, and cementum,—supplying the material which enters into their composition,—and entirely ignoring the enamel pulp. At least no mention is made of an organ which has been described by every histologist who has paid any attention to this subject. In describing the calcification of dentine the author says, in the extended abstract already presented:

"This secretion, deposited against the inner sac, or between it and the pulp, contains the elements of the dentinal structure, is, indeed, the dentine." . . . "The formation of the dentine completed, the covering of it with the enamel begins, or rather this deposit is to a degree coincident with the dentinal formation. Secreted by the same pulp which formed the dentine, the same secretion, some portions of it, finds its way into and through the primary sac." . . . "This membrane continues its existence between these two hard bodies, and receives and modifies, for

the support of the enamel, the liquor sanguinis sucked out from the tubules and intertubular structure. It may be called the enamel membrane."

Again, in speaking of the growth of the root:

"This elongation, with a greater vascularity and vitality assumed by the membrane as it approaches the basement vessels, modifies again the results obtained by the secretion passing through it from the dentinal pulp, the result being a nearer approach to true bone in the production of cementum."

In contradistinction to the theory of the author, it is stated by Mr. Tomes, one of the most careful and conscientious microscopical observers in the world, that "covering the pulp is a transparent membrane closely united to the external cells. *This membrane, which forms the exterior of the dentine, is the first to undergo calcification.* Upon its external surface are developed the hexagonal pits for the reception of the ends of the enamel fibres, each pit corresponding to the end of a line of cells."* In illustration of this statement, engravings are presented of his microscopical observations. If these statements are correct, it may be justly asked, how can a calcified membrane "suck" from the dentinal tubules the liquor sanguinis for the formation of the enamel? Again, the enamel is calcified from within outwards; or, in other words, that portion of the enamel pulp which is in contact with the dental pulp or dentine, is the first to undergo the change. This is not mere theory, but a readily demonstrable fact. Now, while there might be a possibility of the liquor sanguinis passing through the peripheral extremities of the dentinal tubuli if they remained open, it is difficult to conceive how it could do so after their probable closure by the calcareous deposit first made in the cells of the enamel matrix. Why seek, however, for the supply of nutrient material for the enamel organs from the dental pulp, when, according to Mr. Tomes, minute blood-vessels freely traverse the enamel pulp in its *first* or *reticular stage?*† "The reticular tissue of the enamel pulp is intersected with vessels, is infiltrated with gelatinous fluid, and its meshes occupied with developmental cells. Through these vessels, and through the fluid, and afterwards through the meshes of the stellated tissue, the nutriment destined to reach the columnar tissue must pass. There is apparently no other pathway, *unless it goes through the dentine—and this is not probable.*"‡

When a human tooth is first erupted, a thin covering of cementum is found upon it. Is this derived from the dental pulp, as that which envelops the root is said to be? Or are not the materials in each instance obtained from the same source, the vessels of the capsular

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* Dental Physiology and Surgery. By John Tomes. P. 88.

† Op. ct, 96. ‡ Op. ct., 100.

membrane, which on the eruption of the tooth becomes the periodental membrane of the root? How can the hypertrophied or exostosed condition of the root be accounted for in any other way than by supposing the material to be supplied by the vessels of that membrane?

Passing from the consideration of this subject to matters of more immediate moment to the practitioner, the Associate Lesions of First Dentition next claim attention. Under this head the multiform infantile affections, local and general, having their origin or exciting cause in the irritation attendant upon the eruption of the deciduous teeth, are referred to in a clear, succinct manner, along with the general treatment demanded. The importance of an examination of the mouth at this period of existence is fully recognized and dwelt upon. On this point it is very properly remarked: "In the first place, to understand dental irritation, one must be familiar with dental evolution; this, of course, is the understanding of the physiology of the subject. We know the varying periods of eruption, and we are thus, at once, led very direct in our researches. If we find a source of offense as manifested by a tumid, congested gum, we have only to pass a lancet down to the confined tooth, and having done this, we may expect and hope for relief from any general trouble which has been engendered by the just liberated organ." Failure to recognize this simple fact, on the part of the general practitioner of medicine, has resulted in the shattered constitution or untimely death of thousands of children. Anomalies of Second Dentition are classed under seven heads, and their surgical relations indicated. After this come the Teeth and their Diseases, occupying about ten chapters, and embracing the cause and treatment of dental caries, alveolar abscess, trismus, odontalgia, the extraction of teeth, and the employment of anæsthetics. This portion of the work presents a general rather than a detailed consideration of these subjects.

The remainder of the work, about two-thirds of the whole, is devoted to the diseases and injuries of the jaws and surrounding soft parts, and the surgical treatment indicated,—caries, necrosis, fracture and dislocation of the maxillæ, tumors of the mouth, the epulides, osteo-sarcoma, osteo-carcinoma, affections of the antrum, neuralgia, wounds of the mouth, plastic operations upon the lips and cheeks, aphthæ, ranula, palatine defects, obturators, and closing with resection of the maxillary bones. In the limited space granted for a review, it is impossible to do more than mention the subjects treated, and state that the author, taking advantage of the recorded experience of eminent surgeons, combined with his own personal experience in this direction, presents not only the general principles to govern the practitioner in the performance of the necessary operations, but also a large number of cases which have been under his own care and that of other surgeons. The work is profusely illustrated by well-executed engravings, which adds much to its value.

A diversity of opinion may exist on the part of dental practitioners, relative to extending their field of practice by engaging in the performance of surgical operations. There can, however, be but one opinion relative to the importance and necessity of the dentist being thoroughly informed on such subjects. No work has been prepared heretofore to meet their needs; and this one is so well done that it is warmly commended to the dental student and practitioner, as a useful text-book to the former and an invaluable work of reference to the latter.

— J. H. McQ.

Deutsche Vierteljahrsschrift fur Zahnheilkunde. Organ des Central Vereines Deutsche Zahnarzte. Redigirt Ad. Zur Nedden. Nurnberg: For January, April, and July, 1869.

Dr. Ad. Zur Nedden, the able editor of the above magazine, has kindly forwarded the numbers named, along with several valuable monographs, published in Germany. Translations from some of these will be presented in the next number of the Dental Cosmos.

J. H. McQ.

SELECTIONS.

ON GUILLOIS' CEMENT.

BY CHARLES JAMES FOX, M.R.C.S., L.D.S.

I have been for some time expecting to see some communication respecting this cement, recently introduced, as every one who tries it expresses privately extreme satisfaction with it. When this is the case I think it is only fair to say so publicly. It is of the same nature as that commonly called osteoplastic, but it differs from it in this particular, that it can be mixed to a consistence much resembling putty, and in that state can be manipulated for some minutes without setting irretrievably. If you mix the other osteoplastics as thick as this they set rapidly or crumble; if you use them in a thinner condition they run about on the gums and teeth. When once set it is so hard, if it has been properly manipulated, as to turn the edge of the instrument should it be deemed requisite to remove it. As to its durability, it is of course impossible to say much, seeing that it has only been introduced into England for a few months; but this much may be said, that, taking four months' experience with other cements, and four months with this, I have found it so superior that I have entirely discarded all other osteoplastics, amalgams, etc. In small cavities in the incisors, or in shallow cavities where osteoplastics would wash out in a short time and dissolve away, Guillois' cement remains at the end of four months as good as when it was put in. I cannot tell what *further* experience may prove, but *so far*, and only for four months' experience do I speak, I have not had one failure, which is more than I can say of any other.

I believe it may be obtained of Mr. Everard or Mr. Rutterford; and I should be glad if any readers of the *Journal* who try it would give the result of their experience with it.—*Brit. Journ. Dental Science.*

LOOSENING SCREWS AND STOPPERS.

A KNOWLEDGE of the fact that bodies expand by heat, and an application of this knowledge, will often save much trouble. Ground-glass stoppers in bottles often become fast by being put into the necks after the latter are warmed by the fingers, the stoppers being cold. To loosen them, warm the neck by applying a small cloth dipped in hot water, which will expand it and loosen the stopper. Nuts on other machines sometimes become immovable by being put on the screws in cold weather, after the nuts have been warmed by holding in the hands.

The only way to get them off is to expand them again by heating. The work should be quickly done, otherwise the screws will also become heated and expanded. We once saw three strong men trying to unscrew a rusty iron pump. We suggested heating the outer, or hollow screw, when it was loosened with one hand.—*Register of Rural Affairs.*

CASE OF FISTULOUS OPENING IN THE CHIN, CONNECTED WITH A DEVITALIZED TOOTH.

BY J. SCULLY, L.D.S.

J. P., aged twenty-four years, applied at the out-patient department of one of our metropolitan hospitals a few months ago with a fistulous opening in his chin, which had existed for more than six months.

He was seen by one of the house-surgeons, who, on passing a probe into the opening, felt what was supposed to be dead bone, and the case was entered in the books and treated as necrosis of the jaw, the patient being directed to use an injection of iodine for the sinus.

I happened to see this patient one morning, about a fortnight after he first presented himself, and it occurred to me that a tooth might be the cause of the mischief. I may state that no improvement had taken place in his condition under the course of treatment pursued.

An examination of the mouth revealed that the right lower lateral incisor was of an abnormal color, and, on more minute inspection, a cavity was discovered on its mesial surface. A probe passed through the fistulous opening came in contact with the apex of the fang of the devitalized tooth.

The tooth was extracted, and the patient called again in a few days, when the opening was found to have closed.

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I dare say most dentists have met with similar cases, and it is greatly to be regretted that medical men should ever neglect having the state of the teeth carefully inquired into in any cases of fistulous openings about the face.

And although it is probable that we, as dentists, may sometimes extract slightly damaged teeth supposed to be causing certain enlargements of glands, etc., with which they have nothing to do, still our mistake is but a trifling one compared to the long misery that is inflicted on patients by the failure to appreciate the cause of mischief in such cases as I have above ventured to relate.—*Brit. Journ. Dental Science.*

PERISCOPE OF MEDICAL AND GENERAL SCIENCE IN THEIR RELATIONS TO DENTISTRY.

BY GEORGE J. ZIEGLER, M.D.

Physiology. Extract from Introductory Lecture (*Lancet*) in King's College, London, 1869, by Wm. Rutherford, M.D., F.R.S.E., Professor of Physiology at the College.—"Physiology is based upon a tripod, consisting of Anatomy, Chemistry, and Physics. Hence we have physiological anatomy, physiological chemistry, and physiological physics.

"The term 'physiological anatomy' is conventional, and somewhat apt to mislead. Anatomy treats of the structure of human beings: all anatomy must therefore be physiological, inasmuch as it is the province of physiology to determine the functions or actions which the various parts of living beings perform. It has, however, been found convenient to discuss, in a course of human physiology, that part of anatomy which relates to the minute structure of the tissues and organs of the body. This subject has therefore been termed physiological anatomy, and is often also designated general, minute, or microscopic anatomy, or more frequently histology. Physiological chemistry treats of the chemical composition of living beings, together with the chemical changes which take place within them; while in the province of physiological physics are discussed those non-chemical laws regarding matter and energy which are common to animate and inanimate objects. * * * *

"Much, indeed, has already been done in physiological chemistry and physics; yet it is but a tithe of what undoubtedly remains. Physiological chemistry is yet in its infancy; at this moment it resembles the bottomless abyss at the foot of a cataract. A torrent of facts and speculations is continually pouring into a seething, surging gulf, in which there is scarcely anything but unrest. We have to deal with little else than a mass of facts as yet without arrangement. Do not, however, be discouraged by the unsatisfactory picture which I am obliged to place before you; rather let it stimulate you to enter the ranks of those who strive to find out the hidden things which have as yet baffled the investigator. In this great department there is assuredly work enough for centuries yet to come.

"The physicists and the chemists are now more energetic than ever they have been in endeavoring to ascribe vital phenomena to physical and chemical force acting in certain peculiar arrangements of matter. Mayer's great conception, that energy, like matter, can neither be created nor destroyed by man, and that one form of energy is convertible into another, furnished a point of departure, which has led to a new epoch in natural science. This theory, curiously enough, brings us for the explanation of life back to the idea, put forth by Pythagoras, that heat is the parent of vitality. It was a happy guess on the part of the ancient philosopher; while with Mayer, the theory which leads to this conclusion resulted from the consideration of facts well ascertained in modern physics.

"At a future time it shall be my duty to fully explain to you this principle of the conservation of energy put forth by Mayer, and elaborated by Hemholtz, Joule, Grove, Carpenter, and others; but I may at

present briefly say, that on this theory we are led to look at the organic world in this way: we are invited to believe that just as the matter of which living beings consist is simply a peculiar arrangement and combination of that matter of which the inorganic world is composed, so the forces which organic matter exhibits are simply modifications of those forms of energy which we find in the inorganic world: they are but transformations of physical energy effected by peculiar arrangements and combinations of matter.

"Should this theory be established, the notion of a vegetative soul or vital principle governing all the nutritive changes in organic bodies will be upset. Indeed, many leading physiologists have already abandoned their belief in the vital principle, and have adopted the explanations of the physico-chemical school. These have been accused of being materialists, and no doubt the epithet in its most severe sense is applicable to some of them; but, undoubtedly, not a little misconception exists among some of their critics. In the seventeenth century it was Stahl's great error that, while professing to counteract the physico-chemical tendencies of his time, he, in advocating the existence of what we now call a vital principle, identified that spirit with man's reasoning faculty. He failed to see what Aristotle had clearly perceived centuries before him—that a distinction must be made between man's rational soul and his vegetative soul or principle of vitality. Unhappily, there have been many writers since Stahl's time who have fallen into the same error. But it seems to me a great mistake to suppose that if we refuse to believe that a vegetative soul exists in a cabbage or a snail we must necessarily no longer believe in the existence within man of that rational soul which gives him his true nobility. It appears to me that we may refer the vital phenomena of a cabbage to the agency of physico-chemical force, and yet none the less firmly believe in man's spiritual being. *But in all this we must beware lest our fancy carry us beyond the legitimate interpretation of our facts.* It of course becomes us as physiologists to view steadily and inquiringly the aspect presented by living nature, when viewed by the light which physics and chemistry already afford. By working with the aid of that light, we have some chance of rending the thick veil which yet shrouds the nature of life in mystery. For, to the cardinal question of physiology, What is life? we must as yet return the answer—We do not know. If we fold our hands and refuse to believe in anything but a hypothetical vital principle, we shall never know; but when we have learned how to rightly comprehend the various forms of energy and the transformations which matter may undergo, we may be able to say that we have found out the secret of vitality."

"*Uses of Nitrogen in Atmospheric Air.*—Dr. B. W. Richardson says, that the reason that pure oxygen is incapable of sustaining life is different according to the temperature of that oxygen. Thus, at temperatures below 50° Fahr. oxygen cannot enter into combination, but if brought into active motion by heat it will destroy ultimately, by just the opposite process, *i.e.* by setting up too active a combustion. It would be impossible to live surrounded by an atmosphere of oxygen in a climate subject to the variations of temperature common in this country or England. He therefore finds in nitrogen something more than a mere diluent of oxygen, for, says he, 'it is the grand equalizer of heat.

Thus, when the day is cold the loss of heat from the atmosphere is sustained as four to one by the negative nitrogen; and thus when the day is hot the increase of heat in the atmosphere is sustained as four to one by the negative nitrogen. Thus the oxygen, although it undergoes physical change under great variation of heat and cold, and although it is actually more condensed at the poles than the equator, is never so much disturbed but that it can sustain a certain degree of life.' "—(J. H. H., *Amer. Jour. Med. Sci.*)

Nitrogen with Nitrous Oxide for Anæsthesia.—" Some interesting improvements in the mode of administering nitrous oxide gas have recently been perfected by Mr. Coleman, at the Dental Hospital of London. On Thursday, the 7th inst., this gentleman anæsthetized upon a new plan eight patients in the hospital, for the removal of teeth. All who have had much experience in the use of the protoxide of nitrogen have found that any admixture of air with the gas greatly impairs its efficacy. The insensibility is less rapidly and less perfectly produced under these circumstances, while the patient is invariably more excited during, and more prostrated after, the inhalation of the gas. In order therefore to secure the entrance into the blood, through the lungs, of pure nitrous oxide without accompanying air, Mr. Coleman so arranges his apparatus that he first dilutes with nitrogen the oxygen of the residual air of the lungs, and then permits the patient to breathe pure nitrous oxide. By this method the patients become more speedily unconscious, and the anæsthesia lasts longer, at the same time that they appear throughout the administration calmer than is usually the case under the ordinary mode of administration. It is a noteworthy fact, also, that in none of the eight cases was there the least appearance of lividity. During the inhalation of the nitrogen, the pulse was noticed to fall steadily, but upon supplying the nitrous oxide it soon regained its force and frequency. Mr. Coleman stated to those who witnessed the inhalation, that he believed that hydrogen would be more successful than nitrogen; but as the inhalation of that gas often produces disagreeable sensations, he preferred trying the effects of nitrogen before employing hydrogen. If by this new method of administration it shall be found that the anæsthesia produced by nitrous oxide can be rendered more lasting, say for a period of even only ten or fifteen seconds, it will be a great boon to the dentists, who oftentimes have most uncomfortably to expedite their operations with it. As regards cost, the above plan would be found the most economical of any yet devised."—(*Lancet.*)

"*Chloroform and Cold.*—Does chloroform cease to possess anæsthetic properties when its temperature is very low? Dr. Cayley relates in the *Indian Medical Gazette*, that at Ladak, in the month of May, he was called upon to amputate the fingers of a man's hand that had been frozen; the operation took place in a temperature of 45° Fah. (7·22 centigrade), but it was impossible to produce insensibility by means of chloroform, one ounce of which was consumed without producing the least result. The opinion was then advanced that the chloroform had been badly prepared, but a few weeks afterward, the other hand of the same man had to be operated on, the same chloroform was tried and was completely successful, and rapid insensibility was produced with

it; on this day the thermometer marked a little over 70° Fah. (21·11 centigrade)."—(*Cosmos* and *Jour. of Applied Chemistry.*)

Ether Spray in Neuroma.—"In a case of painful neuroma connected with a peroneal nerve, Dr. Richardson's instrument for producing local anæsthesia by means of projected ether spray, completely demonstrated the advantage of this method, in conjunction with the internal exhibition of chloroform. The disease, of which this was a most aggravated instance in a woman who had suffered many things, not from doctors, but from Buddhist nuns and Tauist old wives, is attributed by the Chinese to the driving of a nail into the flesh by the god of thunder as a direct punishment for past sins. In a deep chloroform-sleep, the very approach of the knife seemed to arouse the patient, so that without the additional advantage of the local deadening of the spray, the tumor of eight years' growth could not have been removed. The styptic ether, and the ethereal preparation of iodine, invented by the same friend of humanity, have yielded most excellent results in the practice of the Hospital."—(*Report of the Hankow Medical Mission Hospital*, 1868, and *Med. Times and Gazette.*)

"*Death from Bichloride of Methylene.*—The first recorded death (as far as we are aware) from the inhalation of bichloride of methylene occurred this week in Charing Cross Hospital. The patient, who had been greatly reduced by malignant disease of the jaw, was about to be operated on by Mr. Canton. The anæsthetic agent was being administered by Mr. Peter Marshall, who has had great experience in its use, and only a very small quantity had been given, when the fatal collapse occurred."—(*Medical Times and Gazette.*)

"*Bichloride of Methylene.*—We are informed that two cases have occurred during the last fortnight at the Moorfields Ophthalmic Hospital, in which the inhalation of the bichloride of methylene caused alarming symptoms. In each the symptoms consisted in sudden syncope, and in each they passed wholly and quickly off under appropriate treatment. In each the patient was a young child (in one an infant), and it is suggested that perhaps this agent may be less safe in very young subjects than in adults. The bichloride has of late been extensively used at Moorfields Hospital, its peculiarities of rapid effect and rapidity in passing off, and the seldomness with which it causes sickness, having great value in operations on the eye. The patients are rarely more than a minute under its influence before the operation may be commenced; and after its completion they usually wake up at once, and are able to walk away as soon as the bandages are adjusted. In these respects the contrast between it and chloroform is very great. It is less adapted for prolonged operations."—(*British Med. Journal* and *Boston Med. and Surg. Journ.*)

"*Neuralgia: its Treatment by Electrization.* By A. D. Rockwell, M.D., and Geo. M. Beard, M.D.

"Central Neuralgia.—The pathology of neuralgia is necessarily involved in doubt. Morbid anatomy teaches but little concerning it, because an opportunity to examine carefully the tissues of a 'neuralgic

nerve' is seldom offered. It is, however, regarded by Anstie as probable that all neuralgias depend on atrophy, or a tendency to it, in the posterior roots of the affected nerve, or of some portion of the gray matter of the central nervous system.

"Several circumstances connected with the history of this symptom tend to confirm the idea of the author just mentioned.

"*First.* It is observed that neuralgia is as constantly hereditary as almost any other disease. It does not always manifest itself as such in successive generations, but it may alternate with epilepsy, chorea, hypochondriasis, insanity, and various other neuroses.

"*Second.* There are cases of reflex neuralgia where an irritation of one nerve causes pain in another, which has only a central connection with the first.

"*Third.* The relief obtained by section of a nerve is, as a rule, merely temporary.

"The neuralgia generally returns in the central end. This theory of a central origin, however, cannot by any means be accepted as a universal law. It is disproved by the many neuralgias that arise from merely local causes, such as pressure, ulceration, etc., in constitutions where no hereditary tendency to nervous conditions exists, and before the injury to the nerve itself could possibly impair the vitality of any portion of the gray matter of the nervous centres. While it is impossible to state to what extent the brain and spinal cord are at fault in the production of our common forms of neuralgia, it is well known that it is almost always associated with certain central pathological conditions. It frequently accompanies cerebral effusions, chronic softening of the brain, and meningitis, and is almost an invariable symptom of locomotor ataxy and spinal congestion. * * * *

"PERIPHERIC NEURALGIA.—By peripheric neuralgia is meant that form in which the cause is supposed to be seated, not only external to the nervous centres, but also in some portion of the very nerve affected. These causes are various.

"*First.* Neuritis—or more frequently, perhaps, inflammation of the neurilemma, or sheath of the nerve—is an important factor in the production of neuralgia. This inflammatory condition, again, may depend upon some form of mechanical irritation, as, for example, long-continued pressure of the child's head in labor, on the sciatic plexus, or by the concentrated poison of gout, rheumatism, malaria, or syphilis, acting locally.

"*Second.* Neuroma of spontaneous origin, or as the result of a wound or other injury to the nerve, has long been recognized as another cause of peripheric neuralgia.

"*Third.* The continued action of cold and wind upon a part, exhausting debility, or excessive fatigue, may give rise to the local form of the disease. In many and perhaps the majority of cases of peripheric neuralgia there seems to be no special cause.

"It manifests itself without warning, and sometimes disappears as suddenly as it came.

"Such cases would reveal after death no pathological change, but are what is commonly termed functional or idiopathic in character. Whether the cause lies in a disturbance of the electrical equilibrium, resulting in molecular change in the nerve-trunk or otherwise, we may never know. Doubtless, however, all pain depends on structural change of some por-

tion of the nerve tissue, although in the majority of cases this change is so slight as to escape detection.

"The treatment of peripheric neuralgia is necessarily empirical in the last degree. No manifest cause presents itself, as is generally the case in the constitutional and reflex varieties; consequently the disease must be met as experience dictates, without regard to logical deduction.

"Mild cases of the so-called peripheric neuralgia are of every-day occurrence, and readily yield to treatment or recover spontaneously.

"Others, of a more severe and persistent type, are frequently met with, but are successfully treated by the internal administration of quinine, valerianate of zinc, colchicum, etc., as well as by a variety of local applications. Not unfrequently, however, all the ordinary internal remedies and external appliances prove unavailing. It is in such instances, well illustrated by the following case, that electrization is frequently followed by admirable results.

"Mr. M., aged sixty-five, a man who had enjoyed most excellent health all his life, stated that he suffered acutely and almost constantly during the day, from a persistent and aggravated form of facial neuralgia. When in perfect repose, as in the night after retiring, he suffered but little and slept soundly; but whenever he attempted to converse, or to eat, or in any way to use his jaw, a sharp, shooting pain of a most intense character, and attended by an increased flow of saliva, was excited along the course of the fifth pair. *The action of the direct rays of the sun invariably produced the same result.* Some four years previously, while at dinner, he first felt an acute pricking pain under the ear. These attacks annoyed him occasionally, but in the course of twelve months they became more frequent and severe, and for the last two and a half years he had suffered as stated above. The first application of the faradaic current gave him immediate relief. The paroxysms of pain were excited less readily, were less severe, and not so prolonged. He continued to improve under the influence of three more applications, but in order to hasten the cure, an inverse galvanic current, from eight cells of Stöhrer's battery, was substituted. The effect was temporarily disastrous. The paroxysms of pain returned with all their former severity.

"Fortunately, however, a few gentle applications of the faradaic current repaired the evil produced in this case by the galvanic, and *in less than six weeks* from the commencement of treatment, and after having received fifteen applications, he had so far recovered as to be unconscious of pain during the ordinary efforts of talking and eating.

"No relapse has occurred during the six months since treatment was discontinued.

"It is a well-known physiological fact that the third division of the fifth pair, or great sentient nerve of the face, is a mixed nerve containing both sensitive and motor fibres, and that the principal branches of the seventh pair derive sensitive fibres from inosculation with the fifth pair. This readily accounts for the sympathy that has been observed to exist between them. This point, together with several others of importance, is well illustrated in the following case:

"A lady patient had for eighteen months suffered excessively from periodical attacks of facial neuralgia. Nothing seemed to afford her permanent relief. One morning, soon after an attack of great severity,

she awoke, and, to her great consternation, found that the left side of the face, which had been the seat of the neuralgic affection, was completely paralyzed. A few applications of the faradaic current approximately relieved the paralysis; but, unfortunately, the neuralgia immediately returned with all its former intensity. After a number of weeks of periodical neuralgic suffering, the pain again left her suddenly, and, as before, the paralysis returned, rendering the face even more unsightly than in the first instance. Some two years previously, before the onset of the neuralgia, the patient had been subject to frequent attacks of intermittent fever. On several occasions during the last eighteen months, a slight chill and fever usurped the place of the periodical neuralgia. These facts led us to suppose that the whole difficulty depended on a determination of the malarial poison alternately to the fifth and seventh pairs, producing in the one case neuralgia, and in the other paralysis. In support of this opinion we refer to the following quotation:

"'Dr. Todd, alluding to the dependence of periodical neuralgic affections on the determination of some poison to a particular nerve, as the paludal poison, or some matter generated in the system, expresses the opinion that morbid matters may affect a motor nerve just as they affect a sensitive; causing in the former case paralysis, as in the latter they determine neuralgia.'

"There is another point of interest connected with this case which offers a diagnostic sign of considerable value, between peripheric and the constitutional, central and reflex varieties of neuralgia. It is this: A subcutaneous injection of morphine in the immediate neighborhood of the nerve affected relieved the pain much more quickly and completely than the same operation in some distant part of the body. In constitutional and central neuralgias it manifestly matters little, so far as the relief of pain is concerned, in what portion of the body we make the injection of morphine.

"REFLEX NEURALGIA.—The term reflex, as applied to paralysis, is at once common and suggestive. In the same way it is applicable to neuralgia.

"As in children paralysis frequently follows the irritation of teething or dysentery, and in older persons that of urinary disease; so neuralgia of distant parts may result from uterine and other disorders. Neuralgia of the fifth pair, caused by a carious or false tooth, is a common and well-known reflex result of mechanical irritation. The treatment of reflex neuralgia is by no means so empirical as that of the peripheric variety. If a carious tooth is at the root of the evil it must be removed. (?)

"If the cause can be traced to uterine disease, the skill of the gynecologist is called for. Occasionally electrization, through its power of subduing local irritation or inflammation, effectually relieves the remote neuralgic pain, of which the irritation or inflammation is the cause.

"In the case of a young lady who had suffered for several months from the most severe neuralgic pains down the left leg, tactile examination revealed very marked tenderness to pressure in the left ovarian region. No other portion of the body was especially susceptible to the touch. It is proper to state that the patient was not at all hysterical, that exercise aggravated the pain, and that the neuralgia of the limb was in proportion to the tenderness over the ovary. She was imme-

diately relieved by the faradaic current, and completely recovered in the course of six weeks, after having received twelve applications.

"By the above remarks and cases it is observed that in all its varied forms—constitutional, centric, peripheric, and reflex—neuralgia is susceptible of relief by the method of electrization, either general or localized.

"1st. In the constitutional variety of neuralgia the treatment should invariably be by the method of general electrization with the faradaic current. With few exceptions, its tonic and calming effect soon becomes manifest.

"2d. Certain neuralgias of central origin may be temporarily, and even permanently benefited; but, as a rule, it is evident that we are not to expect very satisfactory results.

"3d. Peripheric neuralgias resulting from anatomical lesion, or the pressure of morbid growths, cannot, of course, be expected to yield to a remedy so simple as electrization. The majority of cases of this division of the disease, however, would seem to be merely functional in character, and are, according to our experience, amenable to treatment by electrization.

"4th. Concerning the reflex variety of neuralgia, it is readily seen that electrization, through its power of allaying local irritation, and giving tone to relaxed parts, may frequently be of undoubted service."—(*Medical Record.*)

Pain in the Ear and Teeth from an Inflamed Eye.—"Jonathan Hutchinson, F.R.C.S., Surg. to the Royal Ophth. Hosp., Moorfields (*Lond. Medical Mirror*), publishes the following: A young man, the subject of acute ulcers of the cornea from injury, with hypopyon, chemosis, and much pain, complained that his eye made his ear and his teeth ache. He never heard it mentioned so definitely before. Here we have an instance in which a pain, certainly beginning peripherally, induced pain in two other distinct and somewhat distant peripheral parts. In some cases in which patients complain of pain in various parts supplied by one fifth nerve, including the eye, we are apt to suspect that the pain may originate centrally."—(*Ibid.*)

"*Removal of the Superior Maxillary Nerve, with the Ganglion of Meckel, and the Inferior Maxillary Nerve, for Persistent Facial Neuralgia.*—Dr. W. H. Mussey (*Cincinnati Lancet and Observer*) reports a case of this kind. The patient, 32 years old, after long and severe labor, was the subject of great excitability and insomnia, lasting six months; he was then attacked with acute pains, occurring several times a day, but which yielded to quinine. Being subsequently exposed to severe cold, he was again attacked with neuralgia, which continued four or five weeks. He continued to be the subject of these severe attacks, and resorted to all kinds of treatment. The seat of the pain was chiefly in the superior maxilla. To relieve the patient it was decided to remove the superior maxillary nerve and the ganglion of Meckel. This was accordingly done, and convalescence was gradual. About two months after paroxysms of pain occurred in the lower maxilla, which became so severe that it was decided to remove the inferior maxillary nerve. This was accomplished to the relief of the patient."—(*Medical Record.*)

"*Scarifying the Gums.*—Dr. F. W. Hatch concludes an article on this subject in the *California Medical Gazette*, in these words:

"1. That while scarifying the gums in infancy is frequently of the most essential service in allaying nervous irritability, and relieving or warding off the early indications of cerebral congestion, the operation is not without danger, and, like all others upon young children, should be performed only for just and sufficient causes.

"2. That it should be resorted to only on the most urgent indications, in systems already reduced by previous disease,—pale, anæmic, and under the influence of mercury. That under these circumstances, it is better to risk the excitement due to difficult dentition than to resort to a remedy which may result fatally; in other words, to bear and counteract the ills we have to deal with, than encourage others we know not of.

"3. That in the cases referred to, the subject of this paper, there was an hemorrhagic diathesis, probably acquired as one of the effects of mercurial influence.

"4. That the condition of the system, especially of the blood, in similar cases, is such, that they must almost of necessity prove fatal."—(*Medical and Surgical Reporter.*)

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"*Staphyloraphy.*—In a report on this subject to the Illinois State Medical Society, Dr. Moses Gunn, of Chicago, gives some interesting statistics. He says:

"Prof. Mussey, of Cincinnati, reports four operations, all on the soft palate. In one case, the patient attained perfect articulation; in another there was improvement; two were lost sight of.

"Prof. Goldsmith, now of Vermont, reports seven operations, six of which were upon the velum, and one upon the entire palate; there was improvement in speech in five.

"Prof. Hodgen, of St. Louis, reports three operations; one on complete fissure, and two on fissure of velum only. In one of the latter two there was decided improvement. In the first case mentioned, an obturator was being fitted at the time of writing.

"Prof. Miner, of Buffalo, reports three operations, two for incomplete, and one for complete fissure. In the latter an obturator was used. Result—decided improvement in one case.

"Prof. Marker, of New York, reports two operations, one of which was for congenital, and one for traumatic fissure. In the congenital case there was very slight improvement, while in the traumatic case there was a perfect restoration of speech. These two cases are especially interesting and instructive, illustrating, as they do, the difference between the recovery of a temporarily lost power and the acquiring of an entirely new art after maturity, and, at best, with but an imperfect organ.

"Prof. Gross writes: 'I do not think that the speech ever improves very greatly after the operation, however successful. This, certainly, has been the result of my own experience, notwithstanding the pains which most of my patients have taken to educate themselves in articulation.'

"Prof. Parker has operated four times, in all instances for fissure of velum only. He writes: 'In each case I was very much disappointed in the result upon articulation. There was no decided improvement.

My disappointment was so great as regards improvement in speech, that for many years I have refused to operate.'

"Your reporter can from his own experience enumerate only three successful operations, and honesty compels him to acknowledge that those were of no benefit to speech.

"A little reflection on the subject will enable us to see why so small rewards should attend, or rather follow upon, this operation. The operation requires for its performance the co-operation of the patient; this is inconsistent with either an anæsthetic condition, or that lack of courage and endurance which, as a general rule, characterizes childhood. Consequently, we are compelled to postpone surgical interference till about the period of dawning maturity. And now, after a successful operation at this late period, the poor unfortunate attempts to learn a new and really difficult art, and that, too, with an imperfect apparatus,—a machine imperfect in one of its important constituents. The difficulties which attend his efforts, and which he must overcome, may be faintly appreciated when, after maturity, we attempt to articulate a new language, or correct, here and there, in our native tongue, a long-practiced habit of incorrect pronunciation. The German, however intellectual by nature, or cultivated by study he may be, finds it almost impossible to articulate some of the sounds of our language, as, for instance, the sound of *th*, while the American finds it equally difficult to express correctly the gutterals of the German. Add to these well-known difficulties a habit grown and matured with the individual of misarticulating each and every articulate element of a language; consider, also, that his machinery for articulation, though materially improved by the operation, is still far from perfect; remember how small is the proportion of really tractable or persevering men, and we shall cease to wonder at the small number who, after this operation, ever attain fair powers of articulation. As a merely surgical procedure, staphyloraphy is a feasible operation; but as to its rewards, a reasonable doubt may yet be entertained."—(*Ibid.*)

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Cleft Palate.—The *Lancet* states that at a late meeting of the Clinical Society of London, "Mr. Marsh described a successful case of operation for cleft palate, in which Mr. Thomas Smith's gag was used. He intimated that the age of two to two and a half years was the best for operating, and said that instances were on record in which the operation had been successfully performed at the ages respectively of six and nine months.

"Mr. Thomas Smith, in opening the discussion, gave an analysis of forty-two cases in which he had performed this operation. About half this number were under the age of seven; one failure occurred in the case of a child ten months old, two at three, and one at thirteen years. Of those operations performed on patients more than eight years old, only one failed. The speaker inclined to the belief that the operation succeeds better if not performed at a very early age.

"Mr. Spencer Wells remarked that the experience of Parisian surgeons was against this operation, because speech appeared to be so litte improved.

"Mr. Smith said that the shape of the palate had much to do with the result, and that children after operation speak better than adults."

Idiopathic Ptyalism.—G. T. Fox, M.D., writes to the *Med. and Surg. Reporter:* "I was called on the evening of 20th of August, 1869, to visit Mrs. H., age 65; found her suffering from profuse ptyalism, and constant dripping of saliva from the mouth, with all the collection of symptoms which indicate the specific action of mercury on the human system, except the fetor.

"In making my inquiries, she told me she had suffered from this nearly eight months, growing gradually worse, and it now weakens her down considerably.

"I made search for some cause of irritation in the neighborhood of the salivary glands; also the teeth and gums, but found none; neither are the principal functions of the system impaired. Her appetite and digestion are tolerably sound.

"Her previous history throws no light on the case. Has always enjoyed good health; had dysentery about ten years ago, from which she had a good recovery.

"I have used astringent washes; gave iron, catechu, chlorate of potash, at different times internally, which checked the flow somewhat. I would have tried the iodide of potash, but knowing it to produce salivation in some subjects, I feared I might aggravate the symptoms. Can she be cured, and what course of treatment shall I pursue? If you can give me any information, it will be thankfully received."

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"*Epithelial Cancer of the Lip.*—This affection (which is now usually called epithelioma) almost always affects the lower lip, and very rarely occurs in women. With regard to the external agencies to the action of which it has been attributed, while Mr. Pemberton does not believe that the use of the short pipe can produce the disease, except as any other irritant might, in persons predisposed to the affection, yet it is, as he observes, at least remarkable that in the only instance in which he has known the disease to occur in a woman, 'the short pipe should have been the constant companion for seventeen years.' As to the causal efficiency of the short clay pipe in inducing epithelioma of the lip, Mr. Collis has no doubt whatever, calling it, indeed, the 'foremost of exciting causes.' He attributes its effect, however, rather to pressure, with the occasional addition of excessive heat, than to any deleterious property of the tobacco.

"Epithelioma of the lip may have to be distinguished from several other affections. Rodent ulcer is as rare in the lower as epithelioma is in the upper lip. Indurated chancre of the lip may be recognized by its history (when that can be obtained), by the great rapidity with which the neighboring glands become enlarged, and by its yielding to anti-syphilitic treatment. 'Cancroid ulcer' of the lip, as described by Mr. Pemberton, seems to us to be one of the varieties of lupus of other writers. It is essentially a local and a chronic disease, though it sometimes unexpectedly becomes the nidus of true epithelioma.

"Complete removal with the knife is the mode of treatment recommended. To be successful it should, of course, be practiced before any glandular complication has occurred.

"'This operation,' says Mr. Pemberton, 'must always be regarded as palliative, and though the extent of diseased surface may hardly prove a barrier to its being undertaken, the existence of enlarged glands in the vicinity should ever determine the surgeon against its performance.'

"Mr. Collis is more hopeful:

"'Indeed,' he says, 'I will go so far as to assert that relapse will never occur where the knife is used in time and all disease removed, provided caustics have not been employed. I have seen the disease completely removed, and a new attack come on in another part of the lip unconnected with the cicatrix of the former operation; but this is essentially different from relapse.'

"Mr. Collis would never use caustics; Mr. Pemberton and Mr. Cooke believe that they may be of service in some cases where excision would be impracticable. The favorite application of the first-named gentleman is the chloride of zinc; that of the latter, the 'manganese-cum-potassa.'"—(J. A., Jr. *Amer. Journ. Med. Sci.*)

"*Epithelial Cancer of the Tongue.*—Among the causes of this painful affection may be mentioned, according to Mr. Pemberton, the presence of ragged and carious teeth, and the degeneration of intractable venereal ulcers. It is to be diagnosticated from ordinary chronic ulceration, and from syphilitic disease of the organ. In the latter affection the glands become sooner involved, but do not form the large and painful tumor which they do in cases of cancer. The treatment of lingual cancer can, at best, be considered as only palliative. Large portions of the tongue or even the whole organ may be removed by operation, the écraseur being the instrument preferably to be employed, as being safer than the knife, and less painful and tedious than the ligature. Division of the gustatory nerve of the side affected, as a means of temporarily relieving pain, has been practiced by Mr. Hilton, and more recently by Mr. Moore, and is certainly worthy of a trial in cases unsuited for excision. The application of the muriated tincture of iron or of the actual cautery may be required to check bleeding in the latter stages of the disease."—(J. A., Jr. *Ibid.*)

"*Artificial Tooth dislodged, swallowed, and impacted in the Œsophagus successfully extracted.* By John Dearden, M.R.C.S.E.—Mr. H——, aged thirty, presented himself at my surgery at noon of the 30th of August, 1869, and stated that, on taking a glass of water to drink, a front false tooth with the gold plate had become dislodged, and that he had swallowed it. He appeared to be much distressed, and complained of great pain in the epigastric region. I asked him to drink a little water; after doing which he complained of great pain and difficulty in swallowing about the spot above described. I proceeded to pass a probang, measuring fourteen inches; about eleven inches of which passed readily enough, when it came against some hard resisting body, which I took for granted was the tooth. I immediately tried to force it down, but to no avail. Having no forceps long enough, I at once fixed on the probang about twenty nooses of strong horse-hair, the nooses lying upward. I passed it down, and with much difficulty succeeded in getting it past the obstacle. I then made gentle traction; and manipulating until I found that some of the nooses had become fixed, I then increased the force, but found the resistance so great that it seemed impossible to bring up the probang or the tooth. At last the horse-hair gave way, and the probang came up, leaving the tooth in the same place. I repeated the operation several times with little better success, the horse-hair being most often cut though; once the tooth was drawn

as high as the cricoid cartilage. I resolved upon trying fresh material for the nooses, and having some very fine steel wire, which I use for sutures, with this I armed the probang, and proceeded to pass it, only more readily than before. After a little careful management and considerable force, to the intense relief of the patient, I succeeded in extracting the tooth. The time occupied from first to last was about forty minutes.

"Sept. 8th.—With the exception of soreness for the first few days after the operation, and restricting himself to a farinaceous diet, the patient has felt no inconvenience, and is now perfectly well.

"The measurement from point to point of the artificial tooth and plate is $1\frac{1}{4}$ in., and from the apex of the tooth to the edge of the plate $\frac{5}{8}$ in. The spike is $\frac{5}{16}$ in. in length; its use was to secure the tooth more firmly by being received into a hole drilled into the old stump.

"I need scarcely make any remarks about the difficulty of extraction when the number of points and the very irregular outline of the plate are taken into consideration."—(*Lancet.*)

Copper Contamination of the Body.—At a late meeting of the Clinical Society of London, "Dr. Clapton read a paper on the Effects of Copper upon the System. Several cases were related which had been under his care as out-patients at St. Thomas's Hospital, and the results given of numerous inquiries which he had made personally at various copper works in London. Several noteworthy phenomena were described, as the presence of distinctly-marked green stains on the teeth close to the gums, bluish-green perspiration, hair of a greenish hue on old workmen, and green discharge from old ulcers. All these points were illustrated by the exhibition of workmen and specimens. Proofs were adduced to show that these colorations were due to absorption, assimilation, and elimination of the copper, and not to a mere local deposit. The probable reasons were given why copper workmen (although an unhealthy-looking class and subject to considerable muscular debility) do not suffer from any specific diseases, as do the workmen in most other metals. Investigations at each of the works elicited the remarkable fact that the men have always escaped cholera and even choleraic diarrhœa, although their neighborhoods suffered severely during the great epidemics.

"Dr. Greenhow had, many years ago, read of discolored gums in copper workers, and having occasion to visit Birmingham, he visited a number of workshops there. He only found the marks in those who worked in what was called soft metal, such as was used for taps. Similar facts with regard to cholera had been observed in Paris.

"Dr. Silver said that the phenomena described by Dr. Clapton had for some time been familiar to him. In several coppersmiths the green line on the teeth had been distinctly visible, and they had usually complained of slight gastro-enteritic symptoms. They were generally sallow or pallid in their complexions, and did not seem strong men. The peculiar coloration of the hair had long been known, and had been supposed to be due to deposition of fine filings. In another class of workmen he had seen peculiar symptoms apparently depending on their occupation. These were men employed in antimony works, where the

fumes of the metal were abundant. They were affected as if with chronic antimonial poisoning."—(*Medical Times and Gazette.*)

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"*Hyperostosis.*—According to Virchow, cases of hyperostosis, or partial gigantic swellings, are frequent, especially in the face, and as a consequence of injuries, from extraction of teeth, for example. The following case related by Sancerotti is one of a general character, and rare. A man thirty-nine years old, in whom, in the course of four years, the face, vertebræ, scapulæ, clavicles, sternum, ribs, femur, and the soft parts corresponding with these bones, were observed to increase in size; deformities which appeared the more monstrous because the other bones remained of their original size. The eyes were forced to the level of the forehead, and the lower jaw extended an inch beyond the upper. He suffered exceedingly from dyspnœa, and the weight of his body increased from 262 pounds to 392. The specific gravity and quantity of the urine were notably increased by salts and earthy phosphates."—(*Journal of Cutaneous Medicine* and *Medical Record.*)

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"*Tolles' New Method of Illuminating Opaque Objects for the Microscope.*—Microscopic objects may be classed in two groups,—those that are transparent, and those that are opaque. The first can be examined by the highest amplifying power that the optician can produce, but until recently it has been impracticable to apply high powers to opaque objects, for the reason that the lens must approach so near to the object (often within one-hundredth of an inch, and in case of very high powers, of French or English make, one-half of that distance), that the lens itself would prevent any light from reaching the object. In 1865 or 1866, Prof. H. L. Smith, then of Kenyon College, Ohio, devised a plan by which light was admitted through the side of the tube of the microscope, and reflected down through the lenses of the objective to the object, which was thus illuminated and seen by the observer. Prof. Smith described his invention in the *American Journal of Science.* When his description reached England some of the London opticians attempted to accomplish the same result, by using modifications of what they called the 'American Contrivance,' after plans that Prof. S. had tried and abandoned as unsatisfactory.

"None of these plans have come into general use; the great difficulty with them has been that most of the light is reflected to the eye of the observer by the lenses, before reaching the object, thus producing a glare, which renders the object indistinct. By very careful and tedious manipulation, the writer has sometimes obtained a pretty good effect with Prof. Smith's illuminator, but more often, after working a long time, has failed.

"Soon after Prof. Smith's instrument was described, Mr. Tolles, then in Canastota, produced an instrument varying materially from the others. In this a prism is inserted in the side of the objective, between the front and middle combinations, of such a shape that a beam of light, received at the side of the objective, is thrown by a totally reflecting surface through one side of the front lens, at such an angle that none of it is reflected, but all passes through and is condensed on the object, and from that reflected back to the eye. Only one of these instruments

(now owned by a physician of this city) was then made. Recently Mr. Tolles has made two more of them, and their performance is such as to promise that little, if any, improvement can be expected in this direction. Opaque objects are seen with 4-10ths and 1-4th inch objectives (from 200 to 500 diameters), brilliantly illuminated on a black background. The appearance of diatoms is similar to that obtained with the parabola, but the details of surface are shown with a distinctness never before seen. Of how much utility this is to prove, and what discoveries are to be made in the works of nature with it, are among the problems that the microscopists are called on to solve. C. S."—(*Boston Journal of Chemistry.*)

"*Nitrophenic Acids.*—Mr. Hirsh points out, in the *Chicago Pharmacist*, the fact that the good fortune of producing carbolic acid perfectly pure, does not consist in the sought for acquisition of the *ne plus ultra* disinfectant which its final purity promised, but rather in the discovery that its accompanying tribes, alcohols of the cresylic and xylic series, rejected so far as worthless, cumbersome appendages, possess superior antizymotic qualities, and the numerous good results ascribed to the use of carbolic acid were in reality due to the presence of the other alcohols mentioned, which even to-day may be found in the bulk of the carbolic acid in the market. In practice, the dark impure creasote was preferred to the light colored, even before the above constituents of the same had been thoroughly studied. Experiments with binitrophenic acid showed that a solution of this acid in ten thousand parts of water produced, in blood serum, a coherent film of coagulum, while a similar solution of carbolic acid produced only turbidity. If the property to coagulate albumen is taken as the *modus operandi* of carbolic acid, the production of the same result by another substance should recommend the latter for the same purpose. Experiments testing the effect of nitrophenic acid on the lower classes of animal life exhibited its powerful action in a remarkable manner. Although the author's experiments were confined to the binitrophenic acid, he does not hesitate to assume the same superiority for the other nitro-compounds."—(*Chemist and Druggist.*)

Plaster of Paris Hardened.—"It is a well-known fact that powdered gypsum, when freed by calcination of its water of crystallization, regains to a great extent its original hardness when incorporated with water enough to form a stiff paste. In order to attain this end, there is at least thirty-three per cent. of water required, wherefrom twenty-two per cent. is withheld as water of crystallization. The rest evaporates, and thus brings about the porosity of the hardened gypsum. In working up a small quantity of gypsum, one has only a few minutes' time for using the paste for moulding or puttying, as it soon becomes hard. With larger quantities, in which case the making of the paste requires a longer time, the mass hardens, sometimes, during the operation of dressing. According to Mr. Puscher, of Nuremberg, this inconvenience may be got rid of by mixing with the dry powdered gypsum from two to four per cent. of finely pulverized althea-root and kneading the intimate mixture to a paste with forty per cent. of water. In consequence of the great amount of pectin which is contained in the althea-root, and which

in fact amounts to about fifty per cent., a mass similar to fat clay is obtained. This mixture begins to harden only after a lapse of one hour's time. Moreover, when dry it may be filed, cut, twined, bored, and thus become of use in the making of domino-stones, dies, brooches, snuff-boxes, and a variety of other things of similar character. Eight per cent. of althea-root, when mixed with pulverized gypsum, retards the hardening for a still longer time, but increases the tenacity of the mass. The latter may be rolled out on window-glass into thin sheets, which never crack in drying, may be easily detached from the glass, and take on a polish readily upon rubbing them. This material, if incorporated with mineral or other paints, and properly kneaded, gives very fine imitations of marble. They bear coloring also when dry, and can then be made water-proof by polishing and varnishing. The artisan, in the practice of his trade, will probably find it to his advantage to make use of this prepared gypsum in place of that usually employed by him; the manufacturer of frames need have no fear that his wares will crack if he uses a mixture of the above-indicated composition; moreover, the chemist and chemical manufacturer will find that the same does excellent service in luting vessels of every kind. The exact proportion of water to be made use of cannot be given exactly, as it varies within the range of a few per cent., according to the fineness and purity of the gypsum employed. The above-mentioned althea-root need not be of the very best quality, the ordinary kind serving the purpose perhaps quite as well."—(*Druggists' Circular.*)

Varnish for Iron.—M. Weiszkopf gives (*Chem. News*) the following "method of producing upon iron a durable black shining varnish: Take oil of turpentine, add to it, drop by drop and while stirring, strong sulphuric acid, until a syrupy precipitate is quite formed, and no more of it is produced on further addition of a drop of acid. The liquid is now repeatedly washed with water, every time refreshed after a good stirring, until the water does not exhibit any more acid reaction on being tested with blue litmus paper. The precipitate is next brought upon a cloth filter, and, after all the water has run off, the syrupy mass is fit for use. This thickish magma is painted over the iron with a brush; if it happens to be too stiff, it is previously diluted with some oil of turpentine. Immediately after the iron had been so painted, the paint is burnt in by a gentle heat, and, after cooling, the black surface is rubbed over with a piece of woolen stuff dipped in, and moistened with, linseed oil. According to the author, this varnish is not a simple covering of the surface, but it is chemically combined with the metal, and does not, therefore, wear off or peel off, as other paints and varnishes do, from iron."

"*Paste.*—The following is a receipt for making common paste, which will keep for a long time without fermentation: Dissolve an ounce of alum in a quart of water warmed; when cold add as much flour as will give it the consistence of cream; then strew into it as much powdered rosin as will lie on a shilling, and two or three cloves, ground. It will keep for a year, and when dry may be softened with water."—(*Chemist and Druggist.*)